United States Department of Agriculture

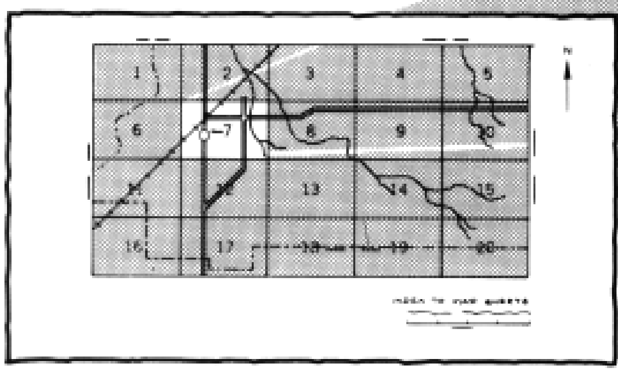
Soil Conservation Service

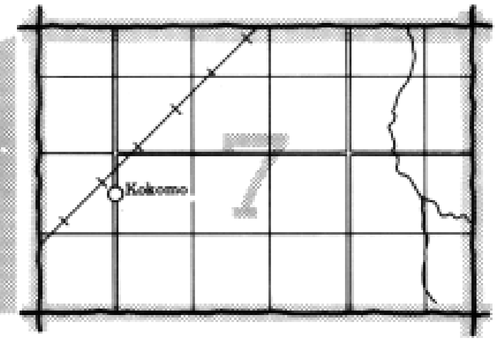
In Cooperation with the Louisiana Agricultural Experiment Station and the Louisiana Soil and Water Conservation Committee

Soil Survey of Avoyelles Parish, Louisiana

HOW TO USE

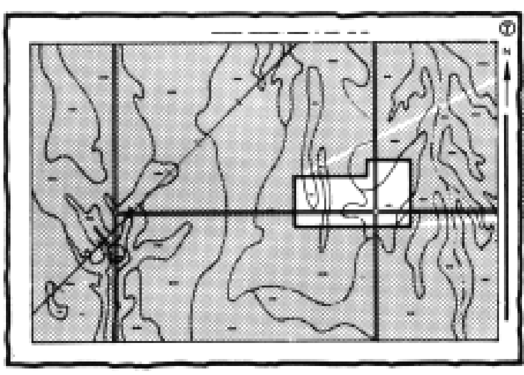
1. Locate your area of interest on the "Index to Map Sheets"

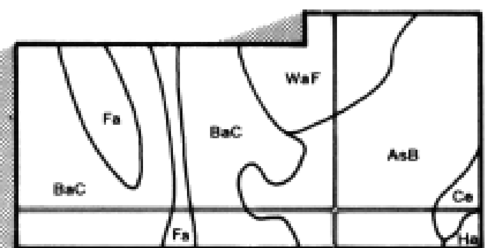




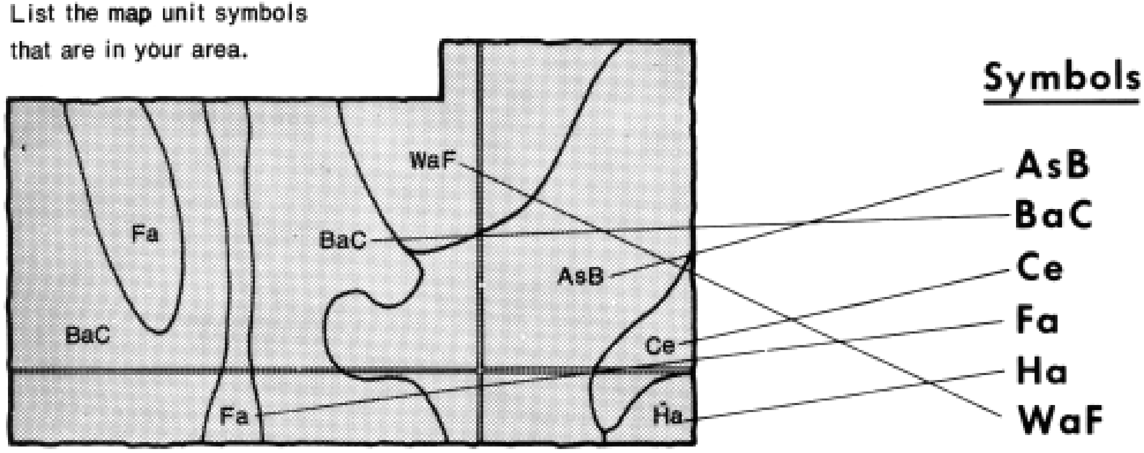
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



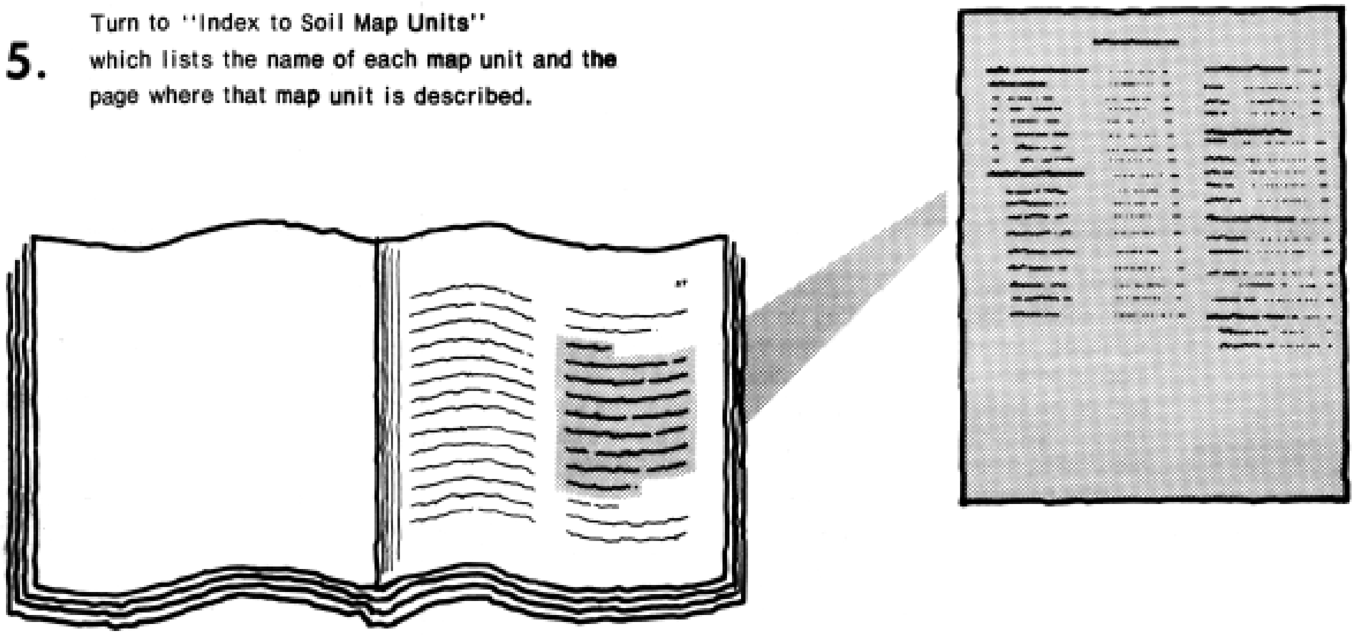


4. List the map unit symbols that are in your area.

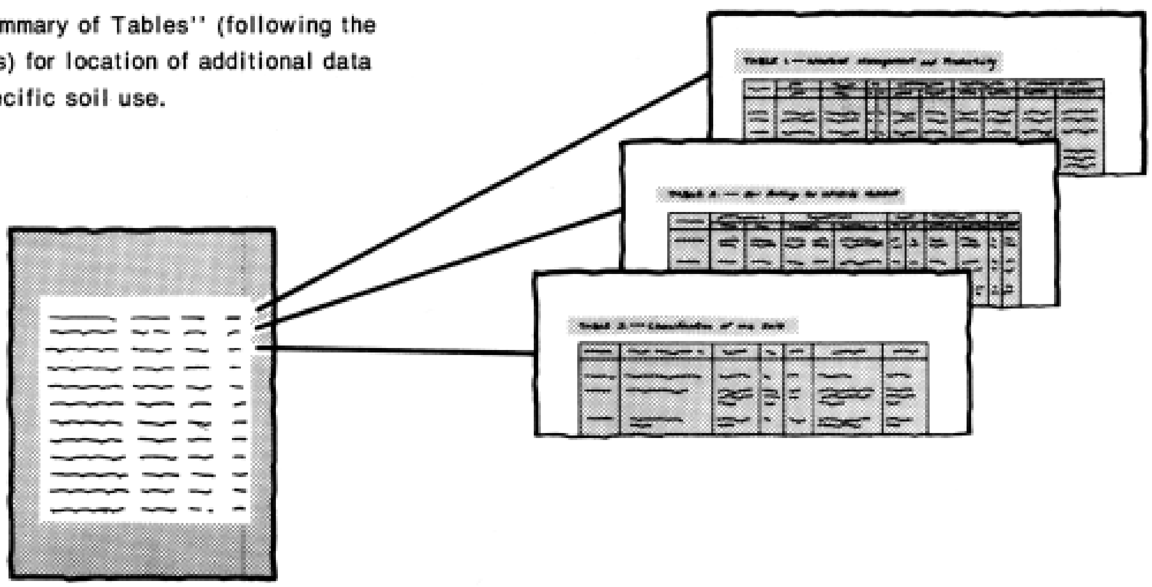


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1976-80. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service, the Louisiana Agricultural Experiment Station, and the Louisiana Soil and Water Conservation Committee. It is part of the technical assistance furnished to the Avoyelles Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Soybeans planted across the slope help control erosion in a cultivated area of Loring silt loam, 2 to 5 percent slopes.

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Issued September 1986

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foreword

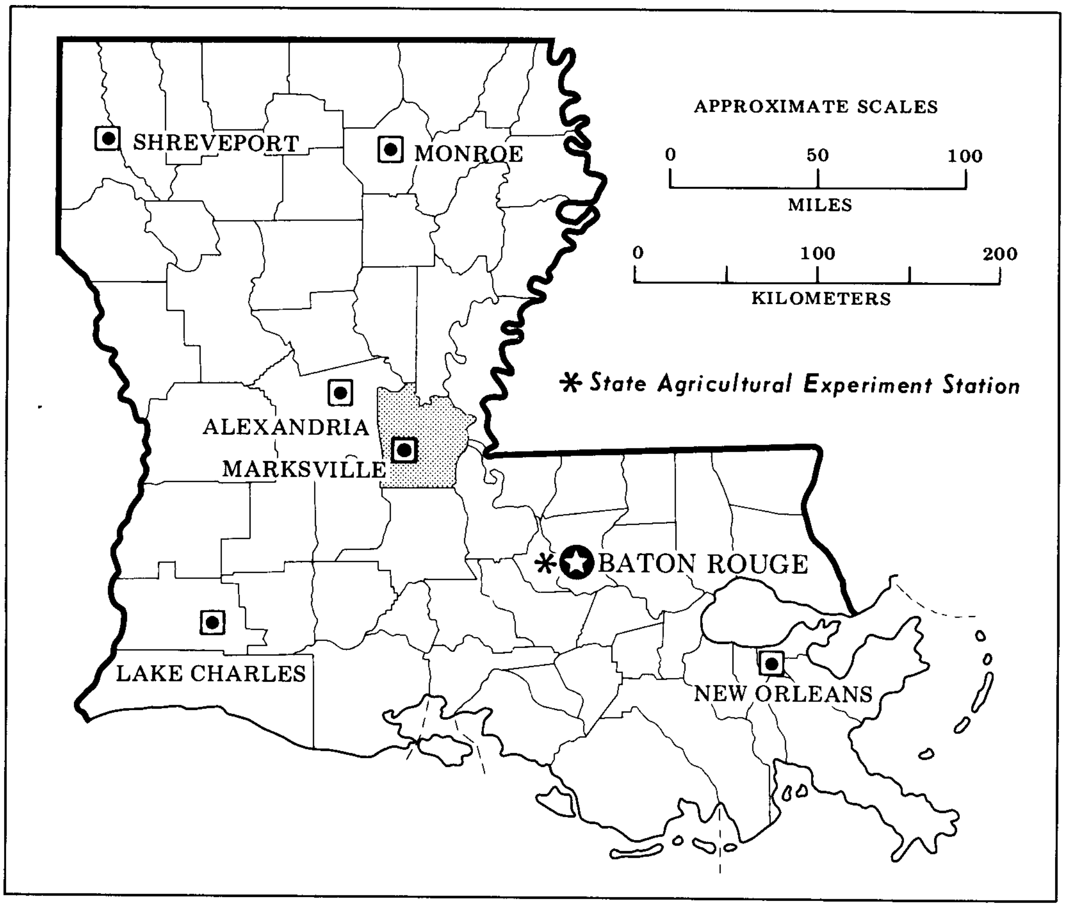
This soil survey contains information that can be used in land-planning programs in Avoyelles Parish. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Harry S. Rucker
State Conservationist
Soil Conservation Service



Location of Avoyelles Parish in Louisiana.

Soil Survey of Avoyelles Parish, Louisiana

By Paul G. Martin, Soil Conservation Service

Soils surveyed by Paul G. Martin and William H. Boyd, Soil Conservation Service, and Marc J. Bordelon, Louisiana Soil and Water Conservation Committee

United States Department of Agriculture, Soil Conservation Service
In cooperation with the Louisiana Agricultural Experiment Station and the Louisiana Soil and Water Conservation Committee

AVOYELLES PARISH is in the east-central part of Louisiana. Marksville, the parish seat, is near the center of the parish and is about 30 miles southeast of Alexandria. The parish is chiefly rural and had a population of 41,434 in 1980. It has a total area of 544,000 acres, of which 523,910 acres is land and 20,090 acres is lakes, bayous, and rivers. The Red River forms part of the northern and eastern boundaries of the parish. It flows into the Atchafalaya River, which serves as the southeastern boundary of the parish. Land use is mainly agriculture and woodland. About 52 percent of the land is cultivated cropland and pasture, and 34 percent is woodland. The present trend is an increasing acreage of cropland and a decreasing acreage of woodland.

The parish is made up of two major physiographic areas: the alluvial plains and the terrace uplands.

The alluvial plain makes up about 85 percent of the parish. It consists of level to undulating soils on natural levees along channels of the Red, Atchafalaya, and Mississippi Rivers and of low, level soils between the natural levees. Most of the soils along the natural levees are loamy and high to medium in fertility. They are used mainly for cultivated crops and pasture. The main crops on these loamy soils are soybeans, cotton, corn, and sugarcane. The soils in the low areas between natural levees and on the lower parts of natural levees are clayey and high in fertility, and they are used for crops, pasture, and woodland. Soybeans is the main crop on these clayey soils.

The terrace upland makes up the remainder of the parish. It consists of nearly level to moderately steep soils on ridgetops and side slopes and in drainageways. Most of these soils in the northwestern part of the parish have a loamy surface layer and a clayey subsoil, and they are mainly used for woodland and pasture. Most of the soils in the terrace upland, south of the Red River, are loamy throughout and are mainly used for cultivated crops, pasture, and homesites. Soybeans and sweet potatoes are the main crops.

The elevation ranges from about 100 feet above sea level in the terrace uplands to as low as 30 feet above sea level on the alluvial plains.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on the soil maps of adjacent parishes. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey.

general nature of the survey area

This section gives general information about the parish. It discusses climate, history and development, agriculture, transportation, flood control, and water resources.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Bunkie in the period 1957 to 1973. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 50 degrees F, and the average daily minimum temperature is 39 degrees. The lowest temperature on record, which occurred at Bunkie on January 12, 1962, is 1[illegible] degrees. In summer the average temperature is 81 degrees, and the average daily maximum temperature is 92 degrees. The highest recorded temperature, which occurred at Bunkie on August 9, 1962, is 104 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 60 inches. Of this, 30 inches, or 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 24 inches. The heaviest 1-day rainfall during the period of record was 7.67 inches at Bunkie on October 28, 1970. Thunderstorms occur on about 70 days each year, and most occur in summer.

Average seasonal snowfall is less than 1 inch. The greatest snow depth at any one time during the period of record was 7 inches. On the average, seldom is there a day that has 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 9 miles per hour, in spring.

history and development

Avoyelles Parish was established as a political unit in 1807, when the Territory of Orleans was divided into 19 separate parishes. Its name is derived from the Avoyelles Indians, who inhabited the area when the early white settlers arrived. These settlers, mainly French and Acadians, were attracted to Avoyelles Parish by the high, flood-free prairies of the terrace uplands. The earliest permanent settlement, Avoyelles Post, was established in 1780 near the present site of Marksville. The prairies were settled first, but later people settled along the streams where the soils were fertile and produce could be easily transported by water to New Orleans.

Avoyelles Parish is one of the leading agricultural areas in the state. Large areas of its once vast hardwood forests have been drained, cleared, and made available for crops and pasture. Industrial development has been slow; however, several nonagricultural industries are in operation.

The seat of government in Avoyelles Parish is Marksville. Its population in 1980 was 5,162. The main communities are Marksville, Bunkie, Cottonport, Mansura, and Simmesport.

agriculture

Avoyelles Parish has always been an agricultural parish. The early settlers grew a variety of crops and raised livestock for subsistence. For a short period, indigo was the main cash crop of the early settlers. By 1810 and for many years thereafter, cotton was the main crop. Cotton acreage reached its maximum of about 50,000 acres in 1930; however, the crop had declined to about 455 acres in 1979. Sugarcane became an important crop by the middle of the 19th century, but it never rivaled cotton. The acreage of sugarcane has also declined steadily from a peak of about 8,000 acres in 1930 to about 3,000 acres in 1979.

Today, soybeans is the main crop in Avoyelles Parish. In 1979 more than 6 million bushels of soybeans, valued at almost 39 million dollars, were produced on approximately 230,000 acres. In 1979 the four main crops in order of cash value were soybeans, sweet potatoes, rice, and sugarcane. Other commercial crops were corn, cotton, grain sorghum, wheat, squash, cabbage, Irish potatoes, and shallots.

In 1979 the value of farm products produced in the parish was estimated at 51,090,366 million dollars, of which 89 percent was from crops, mostly soybeans, and 10 percent was from livestock. Forest products accounted for about 1 percent.

The present trend in Avoyelles Parish is a decrease in the number of farm units and an increase in the average size of farms. The total acreage of cleared cropland and pasture has increased from about 184,000 acres in 1950 to about 347,000 acres in 1980. This trend in changing land use is expected to continue until all areas of bottom-land hardwood forest not dedicated to wildlife habitat are cleared and cultivated.

transportation

Avoyelles Parish is served by two major railroads that connect to every major railroad system in the United States. There are two United States highways and numerous other paved state highways and parish roads. Airports near the towns of Bunkie and Marksville serve small private and commercial aircraft.

Figure 1.—This large earthen levee is part of a complex flood control system that protects a large part of south Louisiana from flooding by the Mississippi, Red, and Atchafalaya Rivers.

Two major water transportation routes—the Red River and the Atchafalaya River—serve Avoyelles Parish. Port facilities are available on the Atchafalaya River at Simmesport. Access to the Mississippi River is available through the Old River Locks near the mouth of the Red River. During low water periods, the Red River is not navigable for its entire length through the parish; however, upon completion of the Red River Navigation Project in the mid-1990's, tug and barge traffic will be possible upriver to Shreveport.

flood control

Avoyelles Parish is at one of the most critical points in the lower Mississippi River flood control system. Because it is at the mouth of the Red River, Avoyelles Parish has experienced many floods, and much attention has been focused on flood control in the parish.

Most of the flooding is caused by overflow from large streams flowing through or bordering the parish and from drainage canals that are used as flood relief channels. Flooding from heavy local storms is minor. Some flooding by backwater also occurs when water levels are high in the Mississippi and Red Rivers. About 160,000 acres in northeastern Avoyelles Parish is subject to backwater flooding.

Flood control in the parish is provided by the Red River levee system and the West Atchafalaya Floodway levee system. Several privately constructed levee systems also protect thousands of acres of agricultural land in areas that are not protected by the major levees. Approximately 200,000 acres of land within the parish is either unprotected or inadequately protected.

About 45,000 acres in the southeastern part of the parish, south of Bayou des Glaises, is in the West Atchafalaya Floodway. This area is west of the Atchafalaya River and is enclosed within large earthen levees (fig. 1). It is part of a complex flood control system operated by the U.S. Army Corps of Engineers that diverts excess water from the Mississippi River when it is at a critical flood stage. A "fuse plug" is at the northern end of the floodway between Hamburg and Simmesport. This plug is designed to erode away when waters behind it reach a predetermined critical level and permit the waters to flow over the levee. The fuse plug levee and the levees on either side of the floodway protect it from floodwaters during typical backwater flood stages and from headwater flooding by the Atchafalaya River. The West Atchafalaya Floodway has never been used; however, the federal government owns floodway flow rights and has the authority to release floodwaters into the floodway.

This soil survey can be used to locate the areas that are subject to flooding. They are delineated on the maps, and the frequency and season of flooding are given in the description of the map units. Soil map units that generally flood more often than 2 years out of 5, between June 1 and November 30, are described as frequently flooded. Those units that generally flood less often than 2 years out of 5, between June 1 and November 30, are called occasionally flooded. Soils that are not subject to flooding or are protected from flooding by levees or pump-off systems are classified as nonflooded.

This soil survey does not replace onsite investigation. The actual flooding frequencies and height of floodwaters are best determined by onsite engineering surveys and flood stage records.

water resources

Surface water.—Avoyelles Parish has about 20,000 acres of surface water. The Red River, which flows across the northern part of the parish and forms part of its northern and eastern boundary, and the Atchafalaya River, which forms part of the eastern boundary, are the largest sources of surface water. Other important streams are Bayou Choctaw, Bayou de Lac, Bayou Boeuf, Bayou des Glaises, Petite Riviere, La Vieille Riviere, Bayou Natchitoches, and West Atchafalaya Diversion Canal. The Spring Bayou complex, Lac aux Perles, and Saline Lake are the largest lakes in the parish.

Ground water.—Two distinct aquifer systems that formed in the Quaternary and the upper Tertiary geologic periods underlie Avoyelles Parish (*13, 24*). The Quaternary aquifer system, composed principally of poorly sorted sand and gravel, underlies the entire parish and ranges from 50 to 150 feet in thickness. The Quaternary system offers the greatest potential source of ground water. Yields of as much as 2,500 gallons per minute can be expected from properly developed wells in most areas of the parish. The water in the Quaternary aquifer system is generally suitable for irrigation; however , its hardness and high content of iron, especially in the part underlying the flood plain, necessitates treatment for most other uses.

Beneath the Quaternary system lies the less permeable upper Tertiary aquifer system, which can yield moderate to large supplies of soft water in the Bunkie-Hessmer and Simmesport-Odenburg areas. Aquifers in the upper Tertiary range from 20 to 80 feet in thickness and are composed principally of well-sorted, fine- to medium-grained sand. Yields ranging from 500 to 1,000 gallons per minute are possible from properly developed wells in the thicker sands. Most of the water in the upper Tertiary aquifer system underlying the Bunkie-Hessmer area has a fluoride content exceeding the recommended limit for public use. The water in the Simmesport-Odenburg area has no qualities restricting its general use and thus offers the greatest potential for public and industrial use in the parish. Saline water-bearing sands occur above the maximum depth of fresh water in both areas, therefore test drilling and electrical logging are advisable to avoid completing a well in a saline aquifer.

Water levels in both aquifer systems are generally less than 50 feet below the surface. The base of fresh ground water in the parish ranges from about 80 to 1,100 feet below the surface. Available data indicate that there is no parish-wide decline in the water level in either aquifer system.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; and the kinds of native plants or crops. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable for a particular use can be identified on the map.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their suitability for major land uses. Table 4 shows the extent of the map units shown on the general soil map. It lists the suitability of each, in relation to that of the other map units, for major land uses and shows soil properties that limit use. Soil suitability ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *cultivated crops, pasture, woodland,* and *urban uses.* Cultivated crops are those grown extensively in the survey area. Pasture refers to pastures of native and improved grasses. Woodland refers to areas of native or introduced trees. Urban uses include housing, industrial, and commercial sites, sites for parks, golf courses, sanitary landfills, and other developments.

The boundaries of the general soil map units in Avoyelles Parish were matched, where possible, with those of the previously published surveys of Evangeline and Rapides Parishes, Louisiana. In a few places, however, the lines do not join and the names of the map units differ. These differences resulted mainly because of changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey area boundaries.

soil descriptions

areas on flood plains dominated by level to undulating, loamy soils

This group of map units consists of well drained and somewhat poorly drained soils that are loamy throughout.

The five map units of this group make up about 25 percent of the parish. Most of the acreage is in crops or pasture. Woodland areas commonly are small and scattered. Seasonal wetness is the main limitation for most uses.

1. Roxana-Norwood

Level to undulating, well drained, alkaline soils that are loamy throughout; formed in Red River alluvium

This map unit consists of soils in high and intermediate positions on the natural levees along the Red River. Relief is slight, and slope ranges from 0 to 5 percent. Large areas of this unit are protected from flooding by the Red River levees, but some areas are subject to flooding.

This map unit makes up about 7 percent of the parish. It is about 77 percent Roxana soils, 20 percent Norwood soils, and 3 percent soils of minor extent.

The Roxana soils are in the highest positions on the natural levees. These soils have a surface layer of reddish brown, slightly acid very fine sandy loam. The underlying material is stratified, reddish brown and yellowish red, neutral and moderately alkaline very fine sandy loam, silt loam, and loamy very fine sand.

The Norwood soils are in high and intermediate positions on the natural levees. These soils have a surface layer of reddish brown, mildly alkaline silt loam or silty clay loam and a subsoil of reddish brown, mildly alkaline silt loam. The underlying material is stratified, reddish brown and yellowish red, moderately alkaline silt loam, silty clay loam, and very fine sandy loam.

Of minor extent are the clayey, somewhat poorly drained Latanier and Moreland soils. They are in low positions on the natural levees.

Most of the soils in this map unit are used for crops. Soybeans is the main crop. A small acreage is in pasture and woodland. The uncleared acreage is generally in eastern cottonwood trees and mixed hardwoods.

This map unit is well suited to crops and pasture. The loamy surface layer and high fertility favor these uses. Land grading or smoothing and a surface drainage system are needed in places. The choice of crops and pasture grasses is limited somewhat in areas that are subject to flooding.

This unit is well suited to woodland. Productivity of eastern cottonwood is very high. Limitations of these soils for this use are few.

Most areas of this unit are well suited to buildings and sanitary facilities. Areas that are not protected from flooding are poorly suited to these uses.

2. Norwood

Level, well drained, alkaline soils that are loamy throughout; formed in Red River alluvium

This map unit consists of soils in high positions on the natural levees of distributaries and abandoned channels of the Red River. Relief is slight, and slope is generally less than 1 percent. Most areas of this unit are protected from flooding by levees; however, some areas in the eastern part of the parish are subject to flooding.

This map unit makes up about 11 percent of the parish. It is about 96 percent Norwood soils and 4 percent soils of minor extent.

The Norwood soils have a surface layer of reddish brown, mildly alkaline silt loam or silty clay loam and a subsoil of reddish brown, mildly alkaline silt loam. The underlying material is stratified, reddish brown and yellowish red, moderately alkaline silt loam, silty clay loam, and very fine sandy loam.

Of minor extent are the clayey, somewhat poorly drained Latanier and Moreland soils. They are in low positions on the natural levees.

The soils in this map unit are used mainly for crops. Soybeans, sugarcane, corn, and cotton are the main crops. A small acreage is in pasture and woodland. The uncleared acreage is generally in mixed hardwoods.

The soils in this map unit are well suited to crops and pasture. The loamy surface layer, high fertility, and level slopes favor these uses. Land grading or smoothing and a surface drainage system are needed in places.

This unit is well suited to woodland. Productivity of eastern cottonwood is very high. Limitations of this soil for this use are few.

This unit is well suited to buildings and sanitary facilities. Areas that are not protected from flooding are poorly suited to these uses.

3. Gallion

Level, well drained, acid soils that are loamy throughout; formed in Red River alluvium

This map unit consists of soils in high positions on the natural levees of old, abandoned channels of the Red River. Relief is slight, and slope is generally less than 1 percent. This unit is protected from flooding by levees.

This map unit makes up about 3 percent of the parish. It is about 85 percent Gallion soils and 15 percent soils of minor extent.

The Gallion soils have a surface layer of brown, medium acid silt loam or dark brown, slightly acid silty clay loam. The subsoil is brown or yellowish red, medium acid to mildly alkaline silt loam, silty clay loam, and very fine sandy loam. The underlying material is yellowish red, slightly acid to moderately alkaline very fine sandy loam.

Of minor extent are the clayey, somewhat poorly drained Latanier and Moreland soils. They are in low positions on the natural levees.

This map unit is used mainly for crops. Soybeans, cotton, and sugarcane are the main crops. A small acreage is in pasture and woodland. The uncleared acreage is generally in mixed hardwoods.

The soils in this unit are well suited to crops and pasture. The loamy surface layer, medium fertility, and level slope favor these uses. Lime and fertilizer are generally needed for crops and pasture.

This unit is well suited to woodland. Productivity of eastern cottonwood is very high. Limitations of this soil for this use are few.

The unit is moderately well suited to buildings and sanitary facilities. Moderate permeability and moderate shrink-swell potential are the main limitations for these uses.

4. Convent-Commerce

Level, somewhat poorly drained, acid and alkaline soils that are loamy throughout; formed in Atchafalaya River alluvium

This map unit consists of soils in high and intermediate positions on natural levees along the Atchafalaya River. Relief is slight, and slope is generally less than 1 percent. Most areas are protected from flooding by the Atchafalaya River levees, but a small area on the unprotected side of the levee is subject to flooding.

This map unit makes up about 1 percent of the parish. It is about 66 percent Convent soils, 21 percent Commerce soils, and 13 percent soils of minor extent.

The Convent soils are in the highest positions on the natural levees. They have a surface layer of dark brown, medium acid and slightly acid very fine sandy loam. The underlying material is dark grayish brown and grayish brown, mildly alkaline and moderately alkaline very fine sandy loam.

The Commerce soils are in intermediate positions on the natural levees. They have a surface layer and subsoil of dark grayish brown, mildly alkaline silt loam. The underlying material is grayish brown, mildly alkaline silt loam and silty clay loam.

Of minor extent are the clayey, poorly drained Sharkey soils. They are in low positions on the natural levees.

This map unit is mainly used for crops. Soybeans is the main crop. A small acreage is in pasture and woodland. The uncleared acreage is generally in eastern cottonwood trees and mixed hardwoods.

The soils in this unit are well suited to crops and pasture. The loamy surface layer, high fertility, and level slope favor these uses. Wetness is the main limitation for these uses. A surface drainage system is needed for crops and pasture. The choice of crops and pasture plants is limited somewhat in areas that are not protected from flooding.

This unit is well suited to woodland. Productivity of eastern cottonwood is very high. Limitations of these soils for this use are few.

The soils in this unit are moderately well suited to buildings and poorly suited to sanitary facilities. Wetness and moderate shrink-swell potential are the main limitations. Areas that are not protected from flooding are poorly suited to these uses.

5. Dundee

Level to gently undulating, somewhat poorly drained, acid soils that are loamy throughout; formed in Mississippi River alluvium

This map unit consists of soils in high positions on natural levees along old distributary channels of the Mississippi River. Relief is slight, and slope ranges from 0 to 3 percent. All areas of this unit are protected from backwater flooding by the Red River and Atchafalaya River levees.

This map unit makes up about 3 percent of the parish. It is about 80 percent Dundee soils and 20 percent soils of minor extent.

The Dundee soils have a surface layer of dark brown, slightly acid silt loam or silty clay loam. The subsoil is dark grayish brown and grayish brown, medium acid silty clay loam and clay loam. The underlying material is grayish brown, neutral very fine sandy loam.

Of minor extent are the poorly drained Baldwin soils in intermediate positions on the natural levees and the very poorly drained Fausse soils in deep channels and swales. Also included are the well drained Gallion soils in high positions on natural levees adjacent to some of the major drainageways and the poorly drained Sharkey soils in swales and in low positions on natural levees.

Most of the acreage has been cleared and is used for crops and pasture. Soybeans is the main crop. A small acreage, mainly in areas of the included Baldwin, Fausse, and Sharkey soils, is in woodland and is used for wildlife habitat and timber production.

This map unit is moderately well suited to crops and well suited to pasture. Wetness is the main limitation of this soil for these uses. Land smoothing and a surface drainage system are needed. Lime and fertilizer are needed for crops and pasture.

This unit is well suited to woodland. The predominant trees are Nuttall oak, water oak, and sweetgum. Logging operations during the winter and early in the spring of most years are limited by wetness.

This unit is moderately well suited to buildings and poorly suited to sanitary facilities. The main limitations of this soil for these uses are wetness, moderately slow permeability, and moderate shrink-swell potential.

areas on flood plains and low stream terraces dominated by level, clayey soils

This group of map units consists of somewhat poorly drained and poorly drained soils that mainly have a clayey surface layer and a clayey subsoil or a clayey and loamy subsoil.

The three map units of this group make up about 31 percent of the parish. Most of the acreage is in cultivated crops or pasture. A few large areas remain in woodland. Wetness, very slow permeability, and very high shrink-swell potential are the main limitations for most uses. Rare flooding is a limitation for some urban uses.

6. Moreland-Lantanier

Level, somewhat poorly drained soils that have a clayey or loamy surface layer and a clayey or clayey and loamy subsoil; formed in Red River alluvium

This map unit consists of broad, level areas in low positions on the Red River alluvial plain. Relief is slight, and slope is generally less that 1 percent. Most areas are protected from backwater flooding by levees; however, all areas are subject to rare flooding and some areas are subject to more frequent flooding during periods of intense or prolonged rainfall.

This map unit makes up about 22 percent of the parish. It is about 84 percent Moreland soils, 15 percent Lantanier soils, and 1 percent soils of minor extent.

The Moreland soils are in low positions on the natural levees along the Red River. These soils have a surface layer of dark reddish brown clay or silt loam. The subsoil is dark reddish brown and reddish brown clay.

The Latanier soils are in intermediate positions on the natural levees of the Red River. These soils have a surface layer of dark reddish brown clay. The subsoil is dark reddish brown clay in the upper part and reddish brown and yellowish red silt loam in the lower part.

Of minor extent are the well drained Gallion and Norwood soils. They are in slightly higher positions on the natural levees

Most of the acreage has been cleared and is used for crops. Soybeans and rice are the main crops. A small acreage is in pasture and woodland.

This map unit is moderately well suited to crops and well suited to pasture. Wetness and poor tilth are the main limitations of the soils for these uses. A surface drainage system is needed. The choice of crops and pasture grasses is limited in areas that are not protected from flooding.

This unit is well suited to woodland. The main trees are water oak, eastern cottonwood, and green ash. Logging operations during the winter and early in the spring are limited by wetness.

This unit is poorly suited to buildings and sanitary facilities. The main limitations of the soils for these uses are wetness, flooding, very slow permeability, and very high shrink-swell potential. Surface drainage is needed to remove excess water. Flooding is a limitation in areas that are not protected by levees.

7. Moreland-Solier

Level, somewhat poorly drained and poorly drained soils that have a clayey or loamy surface layer and a clayey or clayey and loamy subsoil; formed in Red River alluvium and loess or silty alluvium

This map unit consists of clayey soils on flood plains and low stream terraces on the Red River alluvial plain. Relief is slight, and slope is less than 1 percent. Most areas of this unit are protected from flooding by an extensive levee and pump-off system; however, most areas are subject to rare flooding during periods of unusually high rainfall and some areas are subject to more frequent flooding.

This map unit makes up about 5 percent of the parish. It is about 52 percent Moreland soils, 46 percent Solier soils, and 2 percent soils of minor extent.

The somewhat poorly drained Moreland soils are in low positions along drainageways. These soils have a surface layer of dark brown clay or silt loam and a subsoil of dark reddish brown clay.

The poorly drained Solier soils are in flat areas on low stream terraces. These soils have a surface layer of dark reddish brown clay. The subsoil is gray and yellowish red clay in the upper part and gray, yellowish brown, and brown silt loam and silty clay loam in the lower part.

Of minor extent are the somewhat poorly drained Deerford soils and the poorly drained Calhoun soils in higher positions. Also included are the somewhat poorly drained Latanier soils on low ridges.

Most of the soils in this unit are used for crops. A small acreage is in pasture and woodland. Soybeans is the main crop. The main trees in the uncleared areas are overcup oak, red oak, water locust, water hickory, and green ash.

This map unit is moderately well suited to crops and well suited to pasture. Wetness and poor tilth are the main limitations for these uses. A surface drainage system is needed for crops and pasture. The choice of crops and pasture grasses is limited in areas that are not protected from flooding.

This unit is well suited to woodland. Logging operations during the winter and early in the spring are limited by flooding and wetness.

This unit is poorly suited to buildings and sanitary facilities. The main limitations are wetness, flooding, very slow permeability, and a very high shrink-swell potential. Some areas are not protected and are subject to flooding.

8. Sharkey

Level, poorly drained soils that are clayey throughout; formed in Mississippi River alluvium

This map unit consists of clayey soils in broad, level areas on the Mississippi River alluvial plain. Most areas of this unit are subject to rare flooding for brief periods. Large areas are within the West Atchafalaya Floodway and subject to rare flooding by deep and swift waters under unusual conditions of high water. Some of the lower areas flood more often during short periods of prolonged and intense rainfall. Slopes are generally less than 1 percent.

This map unit makes up about 4 percent of the parish. It is about 85 percent Sharkey soils and 15 percent soils of minor extent.

The Sharkey soils have a surface layer of dark gray clay and a subsoil of gray and olive gray clay.

Of minor extent are the somewhat poorly drained Dundee and Tensas soils on low ridges. Also included are the poorly drained Baldwin soils in intermediate positions on the natural levees.

This map unit is used about equally for crops and woodland. Soybeans is the main crop. Wooded areas are used for wildlife habitat and timber production.

This unit is moderately well suited to crops and pasture. Wetness and poor tilth are the main limitations for these uses. Soybeans is the main crop. A surface drainage system is needed for crops and pasture.

This unit is well suited to woodland. The dominant trees are overcup oak, Nuttall oak, water oak, green ash, sugarberry, and sweetgum. Logging operations are generally restricted to the summer and fall because of wetness during winter and spring.

This unit is poorly suited to buildings and sanitary facilities. The main limitations are wetness, flooding, very slow permeability, and very high shrink-swell potential. Areas within the Atchafalaya Floodway are not suited to urban development because floodway flow rights are owned by the Federal Government.

areas on flood plains dominated by level to undulating, clayey soils that are subject to flooding

This group of map units consists of somewhat poorly drained, poorly drained, and very poorly drained soils that have a clayey surface layer and a clayey or a clayey and loamy subsoil.

The two map units of this group make up about 27 percent of the parish. Most of the acreage is in cultivated crops or woodland. Large parts of the remaining acreage are in state-owned wildlife management areas. Flooding, wetness, and very slow permeability are the main limitations for most uses.

9. Sharkey-Tensas

Level to undulating, poorly drained and somewhat poorly drained soils that have a clayey surface layer and a clayey or a clayey and loamy subsoil; formed in Mississippi River alluvium

This map unit consists of soils in broad, level areas and in gently undulating and undulating areas on alluvial plains. Many shallow lakes and bayous are in most areas. This unit is occasionally flooded, generally during the months of December through June. Slope is 0 to 5 percent.

This map unit makes up about 19 percent of the parish. It is about 63 percent Sharkey soils, 29 percent Tensas soils, and 8 percent soils of minor extent.

The poorly drained Sharkey soils are in low positions on the flood plain. These soils have a surface layer of dark reddish brown clay and a subsoil of gray and olive gray clay.

The somewhat poorly drained Tensas soils are on low ridges and in intermediate positions on natural levees along drainageways. These soils have a surface layer of dark reddish gray silty clay. The upper part of the subsoil is grayish brown silty clay, and the lower part is grayish brown silty clay loam and loam.

Of minor extent are the somewhat poorly drained Dundee and Moreland soils, the well drained Norwood soils, and the very poorly drained Fausse soils. The Dundee soils are in high positions on natural levees, the Moreland and Norwood soils are adjacent to the Red River, and the Fausse soils are in old channel scars.

Most of the acreage has been cleared and is used for crops. Soybeans is the main crop. The remaining acreage is in woodland that is used for wildlife habitat and timber production.

This map unit is moderately well suited to cultivated crops and pasture. Wetness, poor tilth, and occasional flooding during the growing season are the main limitations. A surface drainage system is needed for crops and pasture. Planting dates are often delayed because of flooding and wetness.

This unit is well suited to woodland. The dominant trees are overcup oak, Nuttall oak, water oak, green ash, sugarberry, and sweetgum. Logging operations are generally limited to the summer and fall because of wetness and flooding during winter and spring.

This unit is poorly suited to buildings and sanitary facilities. The main limitations are flooding, wetness, very slow permeability, and very high shrink-swell potential. Major flood control structures are necessary.

10. Sharkey-Fausse-Moreland

Level, poorly drained, very poorly drained, and somewhat poorly drained soils that are clayey throughout; formed in Mississippi River and Red River alluvium

This map unit consists of soils in low positions on natural levees and in backswamps on the Red River and Mississippi River alluvial plains. This unit is subject to frequent flooding. Flooding typically occurs during late winter and spring but may occur during any season. Relief is slight, and slope is less than 1 percent.

This map unit makes up about 8 percent of the parish. It is about 46 percent Sharkey soils, 31 percent Fausse soils, 21 percent Moreland soils, and 3 percent soils of minor extent.

The poorly drained Sharkey soils are in low positions on natural levees along old channels of the Mississippi River. These soils have a surface layer of dark reddish brown clay. The subsoil and underlying material are olive gray and gray clay.

The very poorly drained Fausse soils are in depressions and old channel scars. They remain wet throughout the year. The surface layer is dark brown clay. The subsoil and underlying material are gray clay.

The somewhat poorly drained Moreland soils are in low positions on natural levees along present and former channels of the Red River. These soils have a surface layer of dark reddish brown clay. The subsoil is dark reddish brown and reddish brown clay.

Of minor extent are the somewhat poorly drained Latanier soils and the poorly drained Tensas soils. They are in higher positions on the natural levees.

All of the soils in this unit are in woodland and are used for wildlife habitat and timber production.

This unit is poorly suited to commercial woodland. Logging and planting operations are generally limited to the summer and fall because of wetness and flooding during the winter and spring. The dominant trees are water hickory, water locust, green ash, overcup oak, and baldcypress.

This map unit is poorly suited to crops and pasture. Flooding and wetness are the main limitations. The choice of crops and pasture grasses is severely limited because of wetness and the frequency and duration of flooding

This unit is not suited to buildings and sanitary facilities. Flooding and wetness are too severe for these uses, but they can be controlled by the use of major flood control structures.

areas on terrace uplands dominated by level to moderately steep, loamy soils

This group of map units consists of well drained to poorly drained soils that mainly have a loamy surface layer and a loamy or a loamy and clayey subsoil.

The four map units of this group make up about 17 percent of the parish. Most of the acreage is in crops or pasture. Woodland areas are commonly small and scattered. Susceptibility to erosion and wetness are the main limitations for most uses of these soils.

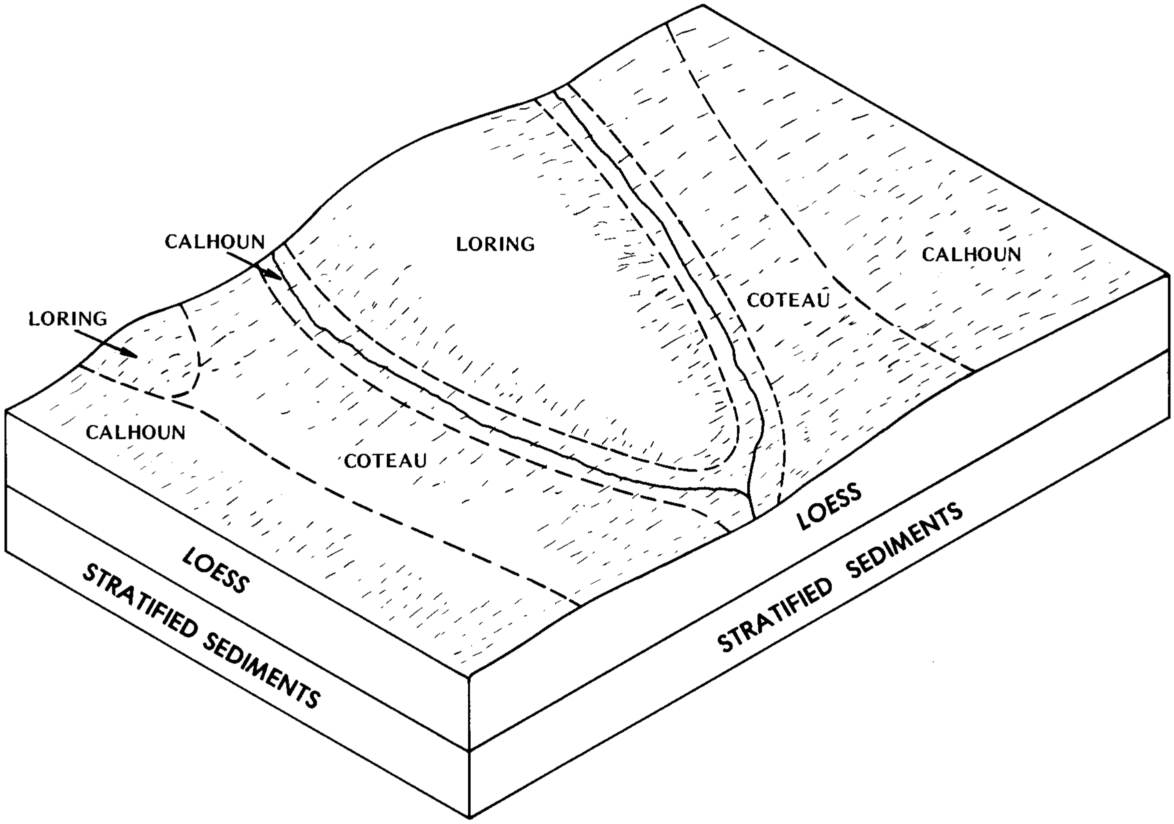


Figure 2.—Pattern of soils, topography, and underlying material in General Soil Map Unit 11.

11. Calhoun-Coteau-Loring

Level to gently sloping, poorly drained, somewhat poorly drained, and moderately well drained soils that are loamy throughout; formed in loess

This map unit consists of soils on broad flats, knolls, and low parallel ridges, and in swales in the terrace uplands. Drainage is provided by small, deeply incised streams. Slopes are generally long and smooth and range from 0 to 5 percent.

This map unit makes up about 10 percent of the parish. It is about 44 percent Calhoun soils, 31 percent Coteau soils, 18 percent Loring soils, and 7 percent soils of minor extent (fig. 2).

The poorly drained Calhoun soils are in broad, level areas and in slightly concave swales. These soils have a surface layer and subsurface layer of grayish brown silt loam. The subsoil is grayish brown silty clay loam and silt loam. The underlying material is yellowish brown silt loam.

The somewhat poorly drained Coteau soils are on gently sloping, slightly convex side slopes and ridgetops. These soils have a surface layer of dark brown silt loam. The subsoil is yellowish brown silty clay loam and silt loam.

The moderately well drained Loring soils are on narrow, convex ridgetops and side slopes. These soils have a surface layer of dark brown silt loam. The subsoil is brown silt loam. A fragipan is at a depth of about 25 inches.

Of minor extent are the well drained Memphis soils on high ridgetops and on the upper parts of side slopes. Also included are the moderately well drained Gore soils on the lower parts of side slopes.

Most of the soils in this unit are used for crops and pasture. Soybeans and sweet potatoes are the main crops. A significant acreage is occupied by towns and villages. A few remaining uncleared areas along drainageways are generally in mixed hardwoods.

This map unit is well suited to crops and pasture. Wetness is the main limitation for these uses in level areas, and erosion is a hazard in sloping areas. A surface drainage system is needed for crops and pasture in level areas. In sloping areas, soil losses from erosion can be minimized by minimum tillage, ccntour farming, and grassed waterways. Moderately high levels of exchangeable aluminum are in the rooting zone of the Coteau soils. This aluminum is potentially toxic to most crops.

This unit is well suited to woodland. Limitations for this use are few. The potential production of loblolly and slash pine is high to very high.

This unit is moderately well suited to buildings and sanitary facilities. Wetness and moderately slow and slow permeability are the main limitations.

12. Memphis-Loring

Nearly level to moderately steep, well drained and moderately well drained soils that are loamy throughout; formed in loess

This map unit consists of soils on convex ridgetops and side slopes along the edges of the loess-mantled terrace uplands. The ridges are generally long and narrow. The map unit is dissected by numerous drainages. Slopes are generally short and smooth and range from 0 to 20 percent.

This map unit makes up 1.5 percent of the parish. It is about 80 percent Memphis soils, 15 percent Loring soils, and 5 percent soils of minor extent.

The well drained Memphis soils are on convex, high ridgetops and on the steeper side slopes. These soils have a surface layer of brown silt loam and a subsoil of brown silt loam and silty clay loam. The underlying material is also brown silt loam.

The moderately well drained Loring soils are on ridgetops and gentle side slopes. These soils have a surface layer of dark brown silt loam and a subsoil of brown silt loam. A fragipan is at a depth of about 25 inches.

Of minor extent are the poorly drained Coteau soils. They are on broad, nearly level ridgetops.

Most of the soils in this unit are used for crops and pasture. A small acreage is used for homesites. Soybeans and sweet potatoes are the main crops. A few remaining uncleared areas on short, steep slopes along drainageways are in mixed hardwoods.

This map unit is well suited to crops and pasture. Fertilizer and lime are generally needed for crops and pastures. In the sloping areas, soil losses from erosion can be minimized by minimum tillage, contour farming, and grassed waterways.

This unit is well suited to woodland. The potential production of loblolly and slash pine is high to very high. There are few limitations for this use; however, erosion control is needed during the planting or harvesting of trees.

This unit is moderately well suited to buildings and sanitary facilities. Slow permeability and slope are the main limitations.

13. Kolin-Vick

Level to gently sloping, moderately well drained and somewhat poorly drained soils that have a loamy surface layer and a clayey and loamy subsoil; formed in old alluvium

This map unit consists of soils on broad ridgetops and upper side slopes in the terrace uplands. It occupies some of the highest elevations in the parish. The unit is drained by numerous small streams. Slope ranges from 0 to 5 percent.

This map unit makes up about 3 percent of the parish. It is about 58 percent Kolin soils, 35 percent Vick soils, and 7 percent soils of minor extent (fig. 3).

The moderately well drained Kolin soils are on the upper parts of side slopes and on convex ridgetops. These soils have a surface layer of dark grayish brown silt loam. The upper part of the subsoil is strong brown and yellowish brown silt loam and silty clay loam, and the lower part is strong brown and yellowish brown silty clay.

The somewhat poorly drained Vick soils are on broad, level ridgetops. These soils have a surface layer of dark grayish brown silt loam and a subsurface layer of pale brown silt loam.The upper part of the subsoil is yellowish brown silt loam and silty clay loam, and the lower part is yellowish brown silty clay and brown silt loam.

Of minor extent are the somewhat poorly drained Crowley Variant soils on broad ridgetops and the moderately well drained Gore soils on lower side slopes. Also included are the poorly drained Guyton soils in drainageways and the poorly drained Wrightsville soils in depressions.

Most of the soils in this unit are in woodland. A few large areas have been cleared and are used for pasture and crops. Soybeans is the main crop. The uncleared areas are generally in loblolly pine, shortleaf pine, and mixed hardwood.

This map unit is moderately well suited to crops and well suited to pasture. Wetness is a limitation on nearly level soils, and erosion is a hazard on the gently sloping soils. In addition, high levels of exchangeable aluminum in the rooting zone of both soils are potentially toxic to most crops. Where used for cultivated crops, soil loss by erosion can be reduced by minimum tillage, contour farming, and grassed waterways. Surface drainage is needed for nearly level soils. Lime and fertilizer are needed for crops and pasture.

This unit is well suited to woodland. The potential production of loblolly pine and shortleaf pine is high. Logging operations during the winter and early in the spring are limited by wetness. Erosion is a hazard along logging roads and skid trails in gently sloping areas.

The soils in this unit are moderately well suited to buildings and sanitary facilities. Wetness and slow and very slow permeability are the main limitations.

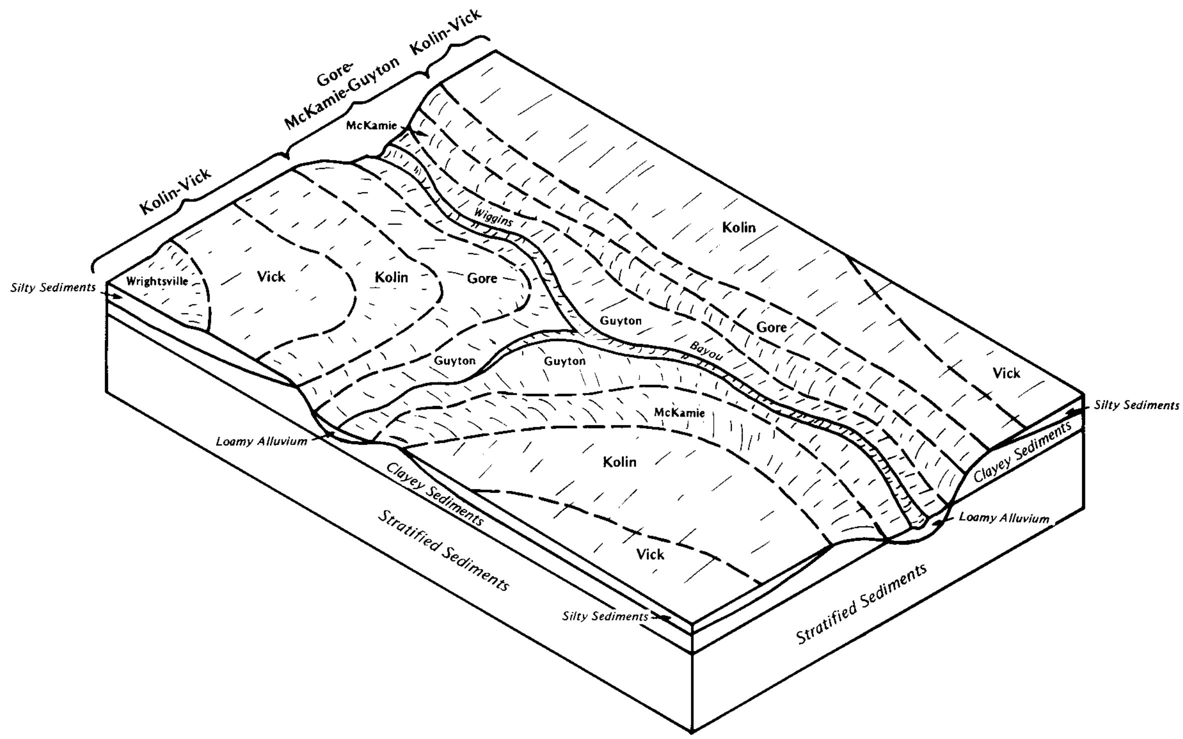


Figure 3.—Pattern of soils, topography, and underlying material in General Soil Map Units 13 and 14.

14. Gore-McKamie-Guyton

Level to strongly sloping, moderately well drained, well drained, and poorly drained soils that have a loamy surface layer and a clayey or loamy subsoil; formed in old alluvium

This map unit consists of soils on side slopes and in frequently flooded drainageways in the terrace uplands. The unit is drained by many small streams. Slope ranges from 0 to 12 percent.

This map unit makes up about 2.5 percent of the parish. It is about 45 percent Gore soils, 28 percent McKamie soils, 25 percent Guyton soils, and 2 percent soils of minor extent (see fig. 3).

The moderately well drained Gore soils are on gently sloping side slopes along drainageways. They have a surface layer of dark grayish brown silt loam and a subsurface layer of brown silt loam. The subsoil is red, yellowish red, light brownish gray, and reddish brown silty clay and clay.

The Guyton soils are on the flood plain of local drainageways. They are poorly drained and subject to frequent flooding. These soils have a surface layer of brown silt loam and a subsurface layer of light brownish gray silt loam. The subsoil is light brownish gray silt loam and silty clay loam.

The well drained McKamie soils are on strongly sloping side slopes along drainageways. These soils have a surface layer of dark grayish brown and dark brown silt loam and a subsoil of red and yellowish red silty clay. The underlying material is stratified, reddish brown and yellowish red silt loam and silty clay loam.

Of minor extent are the moderately well drained Kolin soils on ridgetops and upper side slopes. Also included are the moderately well drained Loring soils on high ridgetops and the somewhat poorly drained Vick soils on flat ridgetops.

Most of the soils in this unit are in woodland. A few small areas are used for pasture and crops.

This map unit is poorly suited to crops and moderately well suited to pasture. The severe erosion hazard and complex slopes are the main limitations along the side slopes, and flooding is the main limitation in the drainageways. Moderately high and high levels of exchangeable aluminum in the subsoil are potentially toxic to most crops. Overgrazing and grazing when the soils are wet cause erosion and gullying. Grazing time and choice of crops are limited by flooding in the drainageways.

This unit is moderately well suited to woodland. The dominant trees on the side slopes are loblolly pines. Water oak is dominant in the flood plains along drainageways. The potential production is moderately high. Flooding restricts logging operations during the winter and spring in the low lying areas. Complex slopes restrict the use of logging equipment. Erosion is a hazard along logging roads and skid trails.

This unit is poorly suited to sanitary facilities and buildings. Very slow permeability, high shrink-swell potential, flooding, and complex slopes are the main limitations.

broad land use considerations

The soils in Avoyelles Parish vary widely in their suitability for major land uses. Approximately 47 percent of the land is used for cultivated crops, mainly soybeans. The cropland is scattered throughout the parish. It is a major land use in all general soil map units, except units 10, 13, and 14. These units are mainly in woodland.

The most highly productive soils are in map units 1, 2, 3, 4, and 5. The main soils in these units are in the Commerce, Convent, Dundee, Gallion, Norwood, and Roxana series. The soils in these units are loamy, have high or medium fertility, and are well suited to most crops. Wetness is the major limitation in growing crops.

Soils in map units 6, 7, 8, 9, 11, 12, and 13 are moderately well suited to crops. The main soils in units 6, 7, 8, and 9 are in the Moreland, Latanier, Sharkey, Solier, and Tensas series. Wetness and poor tilth are the major limitations in growing crops. Flooding is an additional hazard in unit 9. Map units 11, 12, and 13 are on terrace uplands. These soils have medium to low fertility and are acid. Wetness is the main limitation for crops in the Calhoun and Coteau soils of unit 11; droughtiness and an erosion hazard are limitations of the Loring soils. The erosion hazard and moderately steep slopes are the chief limitations in the Memphis, Gore, and McKamie soils of units 12 and 13.

About 4 percent of the land in the parish is in pasture. All of the map units in the parish, except units 8, 9, 10, and 14, are well suited to pasture. Soils in units 8, 9, and 14 are moderately well suited to pasture. The soils in unit 10 are poorly suited to pasture. The main limitations for use as pasture are flooding and wetness. Moderately steep slopes are an additional limitation in unit 14.

Approximately 33 percent of the land in the parish is woodland. All of the soils in the parish, except those in units 10 and 14, are well suited to this use. The soils in map unit 10 are poorly suited, and those in unit 14 are moderately well suited. Limitation to the use of equipment on many of the soils are moderate or severe. This can be overcome by using special equipment or by logging during dry periods.

About 8,500 acres in the parish is urban or built-up areas. The soils in map units 1, 2, 3, 4, 5, 11, 12, and 13 are well suited or moderately well suited to urban use. The main soils in these units are in the Roxana, Norwood, Gallion, Commerce, Convent, Calhoun, Coteau, Dundee, Memphis, and Loring series. The main soil limitations are wetness and high shrink-swell potential for urban use and low strength for streets and roads. The clayey soils in map units 6, 7, 8, 9, and 10 are poorly suited to urban uses because of wetness, high or very high shrink-swell potential, and flooding. The sloping Gore and McKamie soils in map unit 14 are poorly suited because of the high shrink-swell potential and steep slopes. The Guyton soils in unit 14 are subject to frequent flooding.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Moreland clay, occasionally flooded, is one of several phases in the Moreland series.

Some map units are made up of two or more major soils and are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tensas-Sharkey complex, undulating, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

The boundaries of map units in Avoyelles Parish were matched, wherever possible, with those of the published surveys of Evangeline and Rapides Parishes. In a few places the lines do not join, and there are some differences in the names of the map units. These differences result mainly from changes in soil series concepts, differences in map unit design, and changes in soil patterns near survey area boundaries.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

soil descriptions

Bd—Baldwin silty clay loam. This is a level, poorly drained soil in intermediate and low positions on natural levees of old distributary channels of the Mississippi River. Areas are long and narrow and range from 50 to 300 acres. Slope is less than 1 percent.

Typically, the surface layer is very dark gray, slightly acid silty clay loam about 8 inches thick. The subsoil is gray, slightly acid and mildly alkaline silty clay in the upper part; and gray, mildly alkaline silty clay loam in the lower part. The underlying material to a depth of about 60 inches is grayish brown, neutral loam. In places the surface layer is very dark gray clay.

Included in mapping are a few small areas of the Dundee and Sharkey soils. The Dundee soils are in slightly higher positions than the Baldwin soil and are loamy throughout. The Sharkey soils are in lower positions than the Baldwin soil and are clayey throughout.

This Baldwin soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during the months of December through April. The surface layer is sticky when wet, and it dries slowly. This soil swells and shrinks markedly upon wetting and drying. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops. A small acreage is used for pasture and woodland.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness, very slow permeability, and poor tilth. The main crop is soybeans; but rice, sugarcane, corn, and grain sorghum are also suitable crops. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help maintain soil tilth and content of organic matter.

This soil is well suited to pasture. The main limitations of the soil for this use are wetness and very slow permeability. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, tall fescue, white clover, and wild winter peas. Grazing when the soil is wet results in puddling of the surface layer and damage to the plant community. Proper grazing, weed control, and fertilizer are needed for highest quality forage.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods. Tree seeds, cuttings, and seedlings survive and grow well if competing vegetation is controlled or removed by proper site preparation and by spraying, cutting, or girdling. Limited use of equipment is a concern unless drainage is provided.

This soil is poorly suited to urban uses. Its main limitations are wetness, very high shrink-swell potential, and low strength. Excess water can be removed by shallow ditches and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Streets and roads should be designed to offset the limited ability of this soil to support a load. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell capacity.

This Baldwin soil is in capability subclass IIIw and in woodland group 2w6.

Ca—Calhoun silt loam. This is a level, poorly drained soil on broad flats and in swales of the terrace uplands. Areas are irregular and range from 10 to more than 600 acres. Slope is less than 1 percent.

Typically, the surface layer is grayish brown, neutral silt loam about 5 inches thick. The subsurface layer is grayish brown, neutral and medium acid silt loam about 15 inches thick. The subsoil is grayish brown, strongly acid silty clay loam in the upper part and grayish brown, medium acid silt loam in the lower part. The underlying material to a depth of about 76 inches is yellowish brown, medium acid silt loam.

Included in mapping are a few small areas of the Coteau soils. The somewhat poorly drained Coteau soils are on side slopes and slightly convex ridgetops. Also included are a few small areas of the Calhoun soils that are subject to occasional flooding. These included soils make up about 10 percent of the map unit.

This Calhoun soil has medium fertility. Water and air move through it at a slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during the months of December through April. The surface layer remains wet for long periods after heavy rains. This soil has a moderate shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for urban development, mainly sites for houses.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness in the spring and droughtiness in the summer and fall. Soybeans is the main crop; but cotton, rice, sweet potatoes, and vegetables are also suitable crops. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Most crops and pasture plants respond well to complete fertilizers. Lime is generally needed. Where an adequate supply of water is available, supplemental irrigation can prevent damage to crops during dry periods of most years.

This soil is well suited to pasture. Its main limitations are wetness in spring and droughtiness in summer and fall. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, tall fescue, wild winter peas, and white clover. Excess surface water can be removed by field ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods. Wetness limits the use of equipment. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, and trees.

This soil is poorly suited to buildings, local roads and streets, and sanitary facilities. The main limitations of this soil for these uses are wetness and slow permeability. Excess water on the surface can be removed by shallow ditches and proper grading. Internal drainage, however, needs to be improved. Septic tank absorption fields will not function properly on this wet and slowly permeable soil during rainy periods.

This Calhoun soil is in capability subclass IIIw and woodland group 2w9.

Cm—Commerce silt loam. This is a level, somewhat poorly drained soil in intermediate positions on the natural levees of the Atchafalaya River. Areas are long and narrow and range from 10 to more than 100 acres. Slope is less than 1 percent.

Typically, the soil is dark grayish brown and grayish brown, mildly alkaline and moderately alkaline silt loam and silty clay loam to a depth of about 68 inches. In places the subsoil contains thin strata of brown or reddish brown silt loam.

Included in mapping are a few small areas of the Convent and Sharkey soils. The Convent soils are in slightly higher positions than the Commerce soil and contain less clay in the underlying material. The poorly drained Sharkey soils are in lower positions and are more clayey throughout. These included soils make up about 10 percent of this map unit.

This Commerce soil has high fertility. Water and air move through it at a moderately slow rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of 1 1/2 to 4 feet during the months of December through April. This soil is protected from flooding by the levees of the West Atchafalaya Floodway. It has a moderate shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This Commerce soil is well suited to cultivated crops. It is limited mainly by wetness. Soybeans is the main crop; but cotton, corn, sugarcane, small grains, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets can help to remove excess surface water. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility, reduce compaction of the soil and crusting of the surface layer, and help maintain soil tilth and content of organic matter.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, dallisgrass, ryegrass, tall fescue, and white clover. Excess surface water can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed for sustained production of high quality pasture.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods. Tree seeds, cuttings, and seedlings survive and grow well if competing vegetation is controlled or removed by proper site preparation and by spraying, cutting, or girdling.

This soil is moderately well suited to urban development. It has moderate limitations for buildings, local roads and streets, and most sanitary facilities. The main limitation is wetness. Drainage is needed if roads and buildings are constructed. Excess water can be removed by shallow drains and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and moderately slowly permeable soil during rainy periods.

This Commerce soil is in capability subclass IIw and woodland group 1w5.

Cn—Convent very fine sandy loam. This is a level, somewhat poorly drained soil in high positions on the natural levees of the Atchafalaya River. Areas are long and narrow and range from 10 to more than 100 acres. Slope is less than 1 percent.

Typically, the surface layer is dark brown, medium acid and slightly acid very fine sandy loam about 10 inches thick. The underlying material to a depth of about 60 inches is dark grayish brown and grayish brown, mildly alkaline and moderately alkaline very fine sandy loam. In places the underlying material is brown or reddish brown.

Included in mapping are a few small areas of the Commerce and Sharkey soils. The Commerce soils are in slightly lower positions than the Convent soil and contain more clay in the subsoil and underlying material. The poorly drained Sharkey soils are in lower positions and are more clayey. These included soils make up about 10 percent of the map unit.

This Convent soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of 1 1/2 to 4 feet during the months of December through April. Flooding from streams is controlled in most places by levees of the West Atchafalaya Floodway. This soil has a low shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This soil is well suited to cultivated crops. It is limited mainly by wetness. Soybeans is the main crop; but cotton, corn, sugarcane, small grains, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Traffic pans develop easily but can be broken up by deep plowing or chiseling. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crusting of the surface layer and compaction of the soil can be reduced by returning the crop residue to the soil and by using minimum tillage.

This soil is well suited to pasture. It has few limitations for this use. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, dallisgrass, ryegrass, tall fescue, and white clover. Excess surface water can be removed by shallow drains. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed for sustained production of high quality pasture.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods. Wetness can limit the use of equipment somewhat. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is moderately well suited to urban development. It has moderate limitations for buildings, local roads and streets, and most sanitary facilities. The main limitation is wetness. Drainage is needed if roads and buildings are constructed. Excess water can be removed by shallow drains and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and moderately permeable soil during rainy periods.

This Convent soil is in capability subclass IIw and woodland group 1w5.

Cu—Convent very fine sandy loam, occasionally flooded. This is a level, somewhat poorly drained soil on the natural levees of the Atchafalaya River. It is between the river and the levee of the West Atchafalaya Floodway. This soil is subject to occasional flooding. Areas are long and narrow and range from 20 to more than 150 acres. Slope is less than 1 percent.

Typically, the surface layer is dark brown, mildly alkaline very fine sandy loam about 11 inches thick. The underlying material to a depth of about 60 inches is dark grayish brown and grayish brown, mildly alkaline very fine sandy loam. In places the underlying material is brown.

Included in mapping are a few small areas of the Commerce soils and areas of Convent soils that flood frequently. The Commerce soils are in slightly lower positions on the natural levees than the Convent soil and contain more clay in the subsoil and underlying material. These included soils make up about 10 percent of the map unit.

This Convent soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. A seasonal high water table is at a depth of 1 1/2 to 4 feet during the months of December through April. This soil is subject to brief to long periods of flooding from December through July. Floodwaters typically are 2 to 5 feet deep, but the depth exceeds 10 feet in places. Flood duration ranges from 7 days to 1 month. This soil has a low shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for pasture and cultivated crops. A small acreage is used for woodland.

This soil is well suited to pasture. The main limitation of the soil for this use is flooding. Suitable pasture plants are common bermudagrass, vetch, and wild winter peas. Proper stocking, pasture rotation, and restricted grazing during wet periods help to keep the pasture and soil in good shape. Nitrogen fertilizer is needed for sustained production of high quality pasture. During periods of flooding, cattle need to be moved to adjacent protected areas or to pastures at higher elevations.

This soil is moderately well suited to cultivated crops. The main limitations of the soil for this use are wetness and flooding. In addition, the long, narrow delineations of the map unit limit the efficient use of modern multirow equipment. The main crops are soybeans and grain sorghum. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Spring and summer flooding damages crops in some years. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Crusting of the surface layer and compaction of the soil can be reduced by returning the crop residue to the soil and by using minimum tillage.

This soil is well suited to the production of southern hardwoods. The main management concerns in producing and harvesting timber are flooding and wetness. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to April.

This soil is poorly suited to urban development. Wetness from flooding and a seasonal high water table are the main limitations. Major flood control structures and extensive local drainage systems are needed.

This Convent soil is in capability subclass IIIw and woodland group 1w5.

Cv—Coteau silt loam, 1 to 3 percent slopes. This is a gently sloping, somewhat poorly drained soil on slightly convex ridgetops and side slopes in the terrace uplands. Areas are irregular and range from 10 to 200 acres. Slope ranges from 1 to 3 percent.

Typically, the surface layer is dark brown, medium acid silt loam about 6 inches thick. The upper part of the subsoil is yellowish brown, mottled, strongly acid silty clay loam. The lower part to a depth of about 60 inches is yellowish brown, mottled, strongly acid silt loam.

Included in mapping are a few small areas of the Calhoun and Loring soils. The Calhoun soils are in slightly lower positions than the Coteau soil, and the moderately well drained Loring soils are in slightly higher positions. These included soils make up about 10 percent of the map unit.

This Coteau soil has medium fertility. Moderately high levels of exchangeable aluminum in the rooting zone are potentially toxic to most crops. Water and air move through this soil at a moderately slow rate. Water runs off the surface at a slow to medium rate. A seasonal high water table is at a depth of 1 1/2 to 3 feet during the months of December through April. This soil has a moderate shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of most years.

Most of the acreage is used for cultivated crops and pasture. A few areas are used for homesites.

This soil is well suited to cultivated crops. The main crop is soybeans; but sweet potatoes, cotton, corn, Irish potatoes, and vegetable crops are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. If this soil is used for cultivated crops, the main limitations are droughtiness, moderate erosion hazard, and toxic levels of exchangeable aluminum in the subsoil. All tillage should be on the contour or across the slope to reduce soil loss by erosion. The organic matter content can be maintained and the rate of water intake can be increased by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crop residue left on or near the surface also helps conserve moisture, maintain tilth, and control erosion. Most crops respond to fertilizer and liming programs designed to overcome the medium fertility and the moderately high levels of aluminum in the rooting zone. Where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of most years

The soils in this map unit are well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, wild winter peas, and vetch. Grazing when the soil is wet puddles the surface layer and damages the plant community. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to the production of loblolly pine. Wetness limits the use of equipment somewhat during planting and harvesting operations.

This soil is moderately well suited to urban development. The main limitations are wetness and slow permeability. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and slowly permeable soil during rainy periods. Excess water can be removed by shallow ditches and proper grading. Preserving the existing plant cover during construction helps to control erosion. Plant cover can be established and maintained by proper shaping, fertilizing, seeding, and mulching of the slopes.

This Coteau soil is in capability subclass IIe; woodland group 1w8.

Cw—Crowley Variant silt loam. This is a level, somewhat poorly drained soil on broad flats on the terrace uplands. It contains high concentrations of sodium salts in the subsoil. Areas are oblong and range from 100 to 800 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, strongly acid silt loam about 7 inches thick. The subsurface layer is dark grayish brown, strongly acid silt loam about 9 inches thick. The subsoil is red and yellowish red, medium acid clay in the upper part and yellowish brown, slightly acid and mildly alkaline clay and silty clay loam in the lower part. The underlying material to a depth of about 96 inches is dark red, moderately alkaline clay.

Included in mapping are a few small areas of the Vick and Wrightsville soils. The Vick soils are in slightly higher positions than the Crowley Variant and do not have red colors in the subsoil. The poorly drained Wrightsville soils are in slight depressions near the heads of drainageways. These included soils make up about 5 percent of the map unit.

This Crowley Variant soil has low fertility. Moderately high levels of exchangeable aluminum in the rooting zone are potentially toxic to most crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a slow rate. A perched high water table is above the clayey IIB horizon during the months of December through April. Effective rooting depth and available water capacity are limited by concentrations of sodium salts in the subsoil. The surface layer remains wet for long periods after heavy rains. This soil has a very high shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of most years.

Most of the acreage is used for cultivated crops and pasture.

This soil is moderately well suited to cultivated crops. The main limitations are wetness in spring, droughtiness in summer and fall, very slow permeability, and excessive sodium and toxic levels of aluminum in the subsoil. Soybeans is the main crop; but rice, sweet potatoes, corn, and small grains are also suitable crops. This soil is friable and easy to keep in good tilth. Proper row arrangement, field drains, and vegetated outlets are needed to remove excess surface water. Irrigation by flooding is needed for growing rice. Land grading and smoothing improve surface drainage, allow for a more uniform application of irrigation water, and permit more efficient use of farm equipment. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, increases the water intake rate, and helps to conserve moisture. Most crops respond well to fertilizer and liming programs designed to overcome the low fertility and the moderately high levels of aluminum. Where water of suitable quality is available, supplemental irrigation can prevent damage of crops during dry periods of the year.

This soil is moderately well suited to pasture. The main limitations are wetness and droughtiness in summer. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, and white clover. Excess surface water can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is moderately well suited to woodland. The main suitable tree is loblolly pine. Wetness severely limits the use of equipment. The sodium concentration in the subsoil also limits the growth of trees.

This soil is poorly suited to urban uses. Wetness, very high shrink-swell potential, and very slow permeability are severe limitations to use of this soil for buidings, local roads and streets, and most sanitary facilities. A perched seasonal high water table is above the clay subsoil, and drainage should be provided if buildings are constructed on this soil. Excess water can be removed by shallow ditches and proper grading. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods.

This Crowley Variant soil is in capability subclass IIIw and woodland group 2w9.

Da—Deerford silt loam. This is a nearly level, somewhat poorly drained soil on low stream terraces. Areas are irregular and range from 10 to 100 acres. This soil is protected from flooding in most places by large earthen levees, and it is drained with water pumps. Slope ranges from 0 to 2 percent.

Typically, the surface layer is dark brown, medium acid silt loam about 4 inches thick. The subsurface layer is pale brown, medium acid silt loam about 3 inches thick. The subsoil is dark grayish brown, mottled, strongly acid silty clay loam in the upper part; dark yellowish brown, mottled, neutral and mildly alkaline silty clay loam and silt loam in the middle part; and the lower part to a depth of about 93 inches is a buried subsoil of dark brown, mildly alkaline loam and sandy clay loam.

Included in mapping are a few small areas of the Calhoun soils. The poorly drained Calhoun soils are in shallow depressions and swales. These included soils make up about 10 percent of the map unit.

This Deerford soil has medium fertility. Water and air move through it at a slow rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of 1/2 to 1 1/2 feet during the months of December through April. Effective rooting depth and available water capacity are limited by concentrations of sodium in the subsoil. This soil has a moderate shrink-swell potential. Plants generally are damaged by a lack of water during dry periods in summer and fall of most years.

Most of the acreage is used for cultivated crops and pasture.

This soil is moderately well suited to cultivated crops. The main limitations are wetness and excessive sodium in the subsoil. This soil is also droughty during the summer months of most years. Soybeans is the main crop; but cotton, corn, and small grains are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Most crops respond well to complete fertilizers. Lime is generally needed. Where water of suitable quality is available, supplemental irrigation can prevent damage of crops during dry periods of most years.

This soil is moderately well suited to pasture. The main limitations are wetness in spring and droughtiness in summer. Suitable pasture plants are common and improved bermudagrass, tall fescue, Pensacola bahiagrass, ryegrass, vetch, white clover, and wild winter peas. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer is needed for optimum growth of grasses and legumes.

This soil is moderately well suited to woodland. Wetness moderately limits the use of equipment. The sodium concentrations in the subsoil also limit the growth of trees.

This soil is poorly suited to buildings, local roads and streets, and most sanitary facilities. The main limitations of the soil for these uses are wetness and slow permeability. An adequate water control program is needed. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and slowly permeable soil during rainy periods.

This Deerford soil is in capability subclass IIIw and woodland group 2w8.

Dd—Dundee silt loam. This is a level, somewhat poorly drained soil in high positions on natural levees of old distributary channels of the Mississippi River. This soil is protected for flooding by levees of the West Atchafalaya Basin. Areas are long and narrow and range from 10 to more than 100 acres. Slope is less than 1 percent.

Typically, the surface layer is dark brown, slightly acid silt loam about 6 inches thick. The upper part of the subsoil is dark grayish brown, medium acid silty clay loam. The lower part is grayish brown, medium acid clay loam. The underlying material to a depth of about 63 inches is grayish brown, neutral very fine sandy loam.

Included in mapping are a few small areas of the Baldwin and Gallion soils. The poorly drained Baldwin soils are in lower positions than the Dundee soil, and the well drained Gallion soils are in slightly higher positions. These included soils make up about 10 percent of the map unit.

This Dundee soil has medium fertility. Water and air move through it at a moderately slow rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of 1 1/2 to 3 1/2 feet during the months of January through April. This soil has a moderate shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This soil is well suited to cultivated crops. It is limited mainly by wetness. Soybeans is the main crop; but cotton, corn, sugarcane, small grains, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help to maintain soil tilth and content of organic matter. Most crops and pasture plants respond well to complete fertilizers. Lime is generally needed.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, vetch, wild winter peas, and white clover. Excess surface water can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods. The potential production of hardwood trees is high. Wetness limits the use of equipment unless drainage is provided.

This soil is moderately well suited to urban uses. The main limitations are wetness and moderate shrink-swell potential. Drainage is needed if roads and building foundations are constructed. Excess water can be removed by shallow ditches and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and moderately slowly permeable soil during rainy periods. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has slow shrink-swell potential.

This Dundee soil is in capability subclass IIw and woodland group 2w5.

De—Dundee silty clay loam. This is a level, somewhat poorly drained soil on the natural levees of old distributary channels of the Mississippi River. The West Atchafalaya Basin levees protect this soil from flooding. Areas are long and narrow and range from 10 to 150 acres. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown, strongly acid silty clay loam about 7 inches thick. The subsoil extends to a depth of about 60 inches. It is grayish brown, strongly acid silty clay loam in the upper part; grayish brown, medium acid loam in the middle part; and grayish brown, slightly acid loam in the lower part. In some places the subsoil is alkaline. In other places the surface layer is a reddish brown clay.

Included in mapping are a few small areas of the Baldwin and Dundee silt loam soils. The Baldwin soils are in slightly lower positions and are more clayey than the Dundee soil. The Dundee silt loam soils are in slightly higher positions. These included soils make up about 10 percent of the map unit.

This Dundee soil has medium fertility. Water and air move through it at a moderately slow rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. A seasonal high water table is at a depth of 1 1/2 to 3 1/2 feet during the months of January through April. The surface layer is wet for long periods after heavy rains. This soil has a moderate shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops. A small acreage is used for pasture and homesites.

This soil is well suited to cultivated crops. It is limited mainly by wetness. It is also somewhat difficult to keep in good tilth and becomes cloddy if farmed when too wet or too dry. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help to maintain soil tilth and content of organic matter. Crops respond well to lime and fertilizer.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, vetch, white clover, and wild winter peas. Grazing when the soil is wet puddles the surface layer and damages the plant community. Excess surface water can be removed by shallow field ditches. Proper grazing, weed control, and fertilizer are needed for highest quality forage.

This soil is well suited to the production of hardwood trees; however, only a few areas remain in native hardwoods. Tree seeds, cuttings, and seedlings survive and grow well if competing vegetation is controlled or removed by proper site preparation and by spraying, cutting, or girdling. The limitations on the use of equipment are a concern unless drainage is provided.

This soil is moderately well suited to urban development. The main limitations are wetness and a moderate shrink-swell potential. Excess water can be removed by shallow ditches and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and moderately slowly permeable soil during rainy periods. Buildings and roads can be designed to offset the effects of shrinking and swelling.

This Dundee soil is in capability subclass IIw and woodland group 2w5.

Dn—Dundee silty clay loam, occasionally flooded. This is a level, somewhat poorly drained soil on the natural levees of old distributary channels of the Mississippi River. It is occasionally subject to long to very long periods of flooding. Areas are long and narrow and range from 10 to more than 150 acres. Slope is less than 1 percent.

Typically, the surface layer is about 8 inches thick. It is dark brown, slightly acid silty clay loam in the upper part and grayish brown, very strongly acid silty clay loam in the lower part. The upper part of the subsoil is grayish brown, very strongly acid and strongly acid silty clay loam and clay loam, and the lower part is grayish brown, strongly acid loam. The underlying material to a depth of about 65 inches is grayish brown, slightly acid very fine sandy loam. In some places the surface layer is grayish brown silt loam. In other places it is reddish brown clay.

Included in mapping are a few small areas of the Sharkey and Tensas soils. The poorly drained Sharkey soils are in lower positions than the Dundee soils. The Tensas soils are in slightly lower positions and are more clayey in the upper part of the profile. These included soils make up about 10 percent of the map unit.

This Dundee soil has medium fertility. Water and air move through it at a moderately slow rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of 1 1/2 to 3 1/2 feet during the months of January through April. This soil is subject to long to very long periods of flooding in winter, spring, and early summer. It may last for longer than a month. Flooding during the crop growing season occurs in about 2 years out of 15; however, it may occur more often during winter and spring. Floodwaters typically are 1 to 3 feet deep, but the depth exceeds 10 feet in places. This soil has a moderate shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and woodland. A small acreage is used for pasture and wildlife habitat.

This soil is moderately well suited to cultivated crops. The main limitation is wetness from flooding and a seasonal high water table. The main crops are soybeans and grain sorghum. Planting dates are delayed and crops are damaged by floods in some years. This soil is somewhat difficult to keep in good tilth and becomes cloddy if farmed when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Traffic pans develop easily, but they can be broken up by deep plowing or chiseling. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Most crops and pasture plants respond well to lime and fetilizer.

This soil is well suited to the production of southern hardwoods. The main management concerns in producing and harvesting timber are wetness and flooding. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from January to April. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness should be planted. Among the trees that are suitable for planting are cherrybark oak, sweetgum, water oak, and eastern cottonwood.

This soil is well suited to pasture. The main limitations are flooding and wetness. Suitable pasture plants are common bermudagrass, wild winter peas, and vetch. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes. During periods of flooding, cattle need to be moved to adjacent protected areas or to pastures at higher elevations.

This soil is poorly suited to urban development. It has severe limitations for buildings, local roads and streets, and most sanitary facilities. The main limitations are flooding and wetness. Major flood control structures and extensive local drainage systems are needed to control flooding. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and moderately slowly permeable soil during rainy periods.

This Dundee soil is in capability subclass IIIw and woodland group 2w5.

Ds—Dundee-Sharkey complex, gently undulating. These gently undulating, somewhat poorly drained and poorly drained soils are on natural levees of old distributary channels of the Mississippi River. Areas of this complex range from 50 to 350 acres and are about 50 percent Dundee soils and 40 percent Sharkey soils. The landscape consists of narrow, convex ridges and concave swales. The ridges are 1 to 3 feet high and about 100 to 300 feet wide. The swales are about 75 to 275 feet wide. Slope ranges from about 1 percent on ridgetops and in swales to about 3 percent on the side slopes of ridges.

The somewhat poorly drained Dundee soil is on the ridges, and the poorly drained Sharkey soil is in the swales. The soils are so intricately intermingled that it was not practical to map them separately.

Typically, the Dundee soil has a surface layer about 8 inches thick. It is brown, slightly acid silt loam in the upper part and dark grayish brown, slightly acid silty clay loam in the lower part. The subsoil extends to a depth of about 60 inches. It is grayish brown, medium acid silty clay loam in the upper part; grayish brown, medium acid clay loam in the middle part; and gray, slightly acid clay loam in the lower part. In places the surface layer is silty clay loam.

The Dundee soil has medium fertility. Water and air move through it at a moderately slow rate. Water runs off the surface at a slow to medium rate. A seasonal high water table is at a depth of 1 1/2 to 3 1/2 feet during the months of January through April. This soil has a moderate shrink-swell potential. An adequate supply of water is available to plants in most years.

Typically, the Sharkey soil has a surface layer of dark grayish brown, slightly acid clay about 9 inches thick. The subsoil extends to a depth of about 60 inches. It is dark gray, slightly acid clay and silty clay in the upper part and gray, neutral clay in the lower part. In places the surface layer is dark brown.

The Sharkey soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a very slow rate and ponds in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during the months of December through April. Flooding is rare, but it can occur during prolonged, intense storms. The soil swells and shrinks markedly upon wetting and drying. An adequate supply of water is available to plants in most years.

Included in mapping are a few small areas of the Baldwin and Fausse soils. The poorly drained Baldwin soils are on the lower parts of the ridges and are more clayey than the Dundee soils. The very poorly drained Fausse soils are in the lowest parts of the swales. These included soils make up about 10 percent of the map unit.

This unit is used mainly for cultivated crops. A small acreage is used for pasture and woodland.

The soils of this map unit are moderately well suited to cultivated crops. They are limited mainly by wetness and short, choppy slopes. The main crops are soybeans, cotton, corn, and vegetables. The Dundee soil, on the ridges, is friable and easy to keep in good tilth. Traffic pans develop easily but can be broken up by deep plowing or chiseling. The Sharkey soil, in the swales, is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing remove excess water, but in places large volumes of soil need to be moved. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help maintain soil tilth and content of organic matter.

The soils of this map unit are moderately well suited to pasture. The main limitation is wetness. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, tall fescue, ryegrass, and white clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are generally needed for optimum growth of grasses and legumes.

These soils are well suited to woodland. The potential production of eastern cottonwood, sweetgum, and water oak is high. Limitations to the use of equipment are a management concern unless drainage is provided.

The soils of this map unit are poorly suited to urban development. The main limitations are wetness, flooding, low strength, and moderate to very high shrink-swell potential. If areas of this unit are used for building construction, the Dundee soils are better suited than the Sharkey soils. Drainage or other water control systems are needed to remove excess water. Buildings and roads should be designed to overcome the effects of shrinking and swelling of the soils. Unless internal drainage is improved, septic tank absorption fields will not function properly in these wet and moderately slowly to very slowly permeable soils during rainy periods.

These Dundee and Sharkey soils are in capability subclass IIIw. The Dundee soil is in woodland group 2w5 and the Sharkey soil is in 2w6.

Dv—Dundee Variant clay. This is a level, somewhat poorly drained soil on natural levees of old distributary channels of the Mississippi River. The West Atchafalaya Basin levee protects this soil from flooding. Areas are long and narrow and range from 100 to 600 acres. Slope is less than 1 percent.

Typically, the surface layer is about 7 inches thick. It is dark reddish brown, slightly acid clay in the upper part and dark reddish gray, slightly acid clay in the lower part. Below this is a buried surface layer of very dark gray, slightly acid silty clay loam about 7 inches thick. The subsoil extends to a depth of about 72 inches. It is dark grayish brown, slightly acid silty clay loam in the upper part; dark grayish brown, slightly acid loam in the middle part; and grayish brown, slightly acid loam in the lower part.

Included in mapping are a few small areas of the Sharkey and Tensas soils. The Sharkey soils are in lower positions than the Dundee Variant soil and are clayey throughout. The Tensas soils are in slightly lower positions and have a thicker clayey horizon in the upper part of the profile.

This Dundee Variant soil has high fertility. Water and air move through it at a slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between 1 1/2 and 3 1/2 feet below the soil surface during the months of January through April. The surface layer is very sticky when wet and very hard when dry. This soil has a high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops. A small acreage is used for pasture and woodland.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness, slow permeability, and poor tilth. Soybeans is the main crop; but rice, sugarcane, corn, and grain sorghum are also suitable crops. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if farmed when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help maintain soil tilth and content of organic matter.

This soil is well suited to pasture. The main limitations are wetness and slow permeability. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, tall fescue, white clover, and wild winter peas. Proper grazing, weed control, and fertilizer are needed for highest quality forage.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods. The potential production of hardwood trees is high. The use of equipment is limited somewhat by wetness unless drainage is provided.

This soil is moderately well suited to urban development. The main limitation is wetness. Excess water can be removed by shallow ditches and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and slowly permeable soil during rainy periods.

This Dundee Variant soil is in capabilty subclass IIIw and woodland group 2w6.

Fa—Fausse clay. This is a level, very poorly drained soil in depressional areas of the alluvial plain. It is subject to ponding and frequent flooding. Areas are irregular and range from 10 to 1,200 acres. Slope is less than 1 percent.

Typically, the surface layer is dark brown, medium acid clay about 7 inches thick. The next layer is dark gray, slightly acid clay about 6 inches thick. The subsoil is gray, slightly acid and neutral clay. The underlying material to a depth of 66 inches is gray, neutral clay. In places the surface layer is very dark gray or black muck.

Included in mapping are a few small areas of the Sharkey soils. These soils are in slightly higher positions and are better drained than the Fausse soil. These included soils make up about 10 percent of the map unit.

This Fausse soil has high fertility. Water and air move through it at a very slow rate. It is subject to brief to long periods of ponding and flooding during any season of the year, but it is generally flooded continuously from late fall to early summer. Depth of floodwaters is typically 1 to 3 feet, but it may exceed 10 feet in places. During nonflood periods, a seasonal high water table fluctuates between a depth of 2 feet and the surface. This soil has a very high shrink-swell potential, but it seldom dries out enough to crack. An adequate supply of water is available to plants in most years.

Most of the acreage is used for woodland and wildlife habitat.

This soil is poorly suited to the production of commercial timber. The main concerns in producing and harvesting timber are extreme wetness and frequent flooding. Among the trees that are suitable for planting are baldcypress and green ash (fig. 4).

The Fausse soil is not suited to cultivated crops, pasture, or urban uses. Wetness from ponding and flooding is a severe limitation for these uses. Major flood control structures and extensive local drainage improvements are needed to protect this soil from ponding and flooding.

This Fausse soil is in capability subclass VIIw and woodland group 4w6.

Ga—Gallion silt loam. This is a level, well drained soil on the natural levees of old distributary channels of the Red River. Areas are long and narrow and range from 10 to 300 acres. Slope is less than 1 percent.

Typically, the surface layer is brown, medium acid silt loam about 8 inches thick. The subsoil is brown, medium acid silty clay loam in the upper part and yellowish red, medium acid silt loam and very fine sandy loam in the lower part. The underlying material to a depth of about 66 inches is yellowish red, slightly acid very fine sandy loam. In places the Gallion soil is calcareous throughout.

Included in mapping are a few small areas of the Dundee and Norwood soils. The somewhat poorly drained Dundee soils are in slightly lower positions than the Gallion soil. The Norwood soils are in slightly higher positions and are calcareous throughout. These included soils make up about 10 percent of the map unit.

This Gallion soil has medium fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate. This soil dries rapidly after heavy rains. It has a moderate shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This soil is well suited to cultivated crops. It has few limitations. Soybeans is the main crop; but cotton, sugarcane, corn, small grains, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or

Figure 4.—The main trees in this area of Fausse clay are baldcypress and green ash. This soil is poorly suited to commercial timber.

subsoiling. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help maintain soil tilth and content of organic matter.

This soil is well suited to pasture. It has few limitations. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, johnsongrass, ryegrass, and white clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are generally needed for optimum growth of grasses and legumes.

This soil is well suited to woodland. It has few limitations for this use; however, only a few areas are in native hardwoods. The potential production of hardwood trees is high.

This soil is moderately well suited to urban development. Moderately slow permeability and moderate shrink-swell potential limit its use for buildings, local roads and streets, and most sanitary facilities. Septic tank absorption fields may not function properly in this soil during rainy periods because of its moderately slow permeability. This limitation can be overcome by increasing the size of the absorption field. Buildings and roads can be designed to offset the effects of shrinking and swelling.

This Gallion soil is in capability class I and woodland group 2o4.

Go—Gallion silty clay loam. This is a level, well drained soil on the natural levees of old distributary channels of the Red River. Areas are long and narrow and range from 20 to 200 acres. Slope is less than 1 percent.

Typically, the surface layer is dark brown, slightly acid silty clay loam about 6 inches thick. The upper part of the subsoil is yellowish red, mildly alkaline silty clay loam. The lower part is yellowish red, mildly alkaline silt loam. The underlying material to a depth of about 60 inches is yellowish red, moderately alkaline very fine sandy loam.

Included in mapping are a few small areas of the Latanier and Moreland soils. The Latanier soils are in slightly lower positions than the Gallion soil and have a clayey surface layer and subsoil. The Moreland soils are in lower positions and are clayey throughout. These included soils make up about 10 percent of the map unit.

This Gallion soil has medium fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. This soil has a moderate shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This soil is well suited to cultivated crops. It is limited mainly by wetness. The main crops are soybeans, cotton, sugarcane, corn, and vegetables. The soil is somewhat difficult to keep in good tilth and becomes cloddy if farmed when it is too wet or too dry. Land grading and smoothing remove excess water. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, johnsongrass, ryegrass, and white clover. Grazing when the soil is wet puddles the surface layer and damages the plant community. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer is generally needed for optimum growth of grasses and legumes.

This soil is well suited to the production of southern hardwoods; however, only a few areas remain in native hardwoods.

This soil is moderately well suited to urban development. Moderate permeability and moderate shrink-swell potential are slight to moderate limitations to use of this soil for buildings, local roads and streets, and most sanitary facilities. The limitation of moderate permeability can be overcome by increasing the size of the absorption field. Buildings and roads should be designed to offset the effects of shrinking and swelling.

This Gallion soil is in capability subclass IIw and woodland group 2o4.

Gr—Gore silt loam, 1 to 5 percent slopes. This is a gently sloping, moderately well drained soil on convex ridgetops and side slopes in the terrace uplands. Areas are irregular and range from 5 to 150 acres. Many well-defined drainageways dissect most areas.

Typically, the surface layer is dark grayish brown, strongly acid silt loam about 4 inches thick. The subsurface layer is brown, strongly acid silt loam about 3 inches thick. The subsoil is red, strongly acid silty clay in the upper part; light brownish gray, mottled, strongly acid silty clay in the middle part; and yellowish red and reddish brown, strongly acid and medium acid silty clay and clay in the lower part. The underlying material to a depth of about 66 inches is reddish brown, neutral clay. In places the subsoil is yellowish brown.

Included in mapping are a few small areas of the Kolin and McKamie soils. The Kolin soils are in slightly higher positions than the Gore soil and contain less clay in the upper part of the subsoil. The McKamie soils have steeper slopes and are well drained. Also included are a few small areas of soils that are similar to the Kolin soils except that they are loamy throughout. These included soils are similar in position to the Gore soils. These included soils make up about 15 percent of the map unit.

This Gore soil has low fertility. High levels of exchangeable aluminum in the rooting zone are potentially toxic to most crops. Water and air move through this soil at a very slow rate. Runoff is medium to rapid, and the hazard of water erosion is severe. The surface layer generally is friable and easy to till; however, it is somewhat difficult to keep in good tilth where cultivation has mixed some of the clayey subsoil into the plow layer. This soil has high shrink-swell potential in the subsoil. Plants are damaged by lack of water during dry periods in summer and fall of most years.

Most of the acreage is used for woodland and pasture. A small acreage is used for cultivated crops.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. The site index for loblolly pine ranges from 75 to 80. The main concerns in producing and harvesting timber are wetness and the erosion hazard. Because the clayey subsoil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Management that minimizes the risk of erosion is essential in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is moderately well suited to pasture. The main limitations are droughtiness and a severe erosion hazard. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, singletary peas, vetch, and crimson clover. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. It is limited mainly by droughtiness, short and irregular slopes, toxic levels of exchangeable aluminum, and a severe erosion hazard. Early fall seeding, minimum tillage, and terraces, diversions, and grassed waterways can be used to control erosion. All tillage should be on the contour or across the slope. Maintaining crop residue on or near the surface reduces runoff and helps maintain soil tilth and organic matter content. Most crops respond to fertilizer and liming programs designed to overcome the low fertility and the high levels of aluminum in the rooting zone.

This soil is poorly suited to urban development. It has severe limitations for buildings, local roads and streets, and most sanitary facilities. If buildings are constructed on this soil, foundations and footings must be properly designed and runoff must be diverted away from buildings to prevent structural damage caused by shrinking and swelling. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons should be constructed where this soil is used for homesites. Preserving the existing plant cover during construction helps to control erosion. Plant cover can be established and maintained by proper shaping, fertilizing, seeding, and mulching of the slopes.

This Gore soil is in capability subclass IVe and woodland group 3c2.

Gy—Guyton silt loam, frequently flooded. This is a level, poorly drained soil on the flood plains of streams that drain the terrace uplands. It is subject to frequent flooding. Areas are long and narrow and range from 20 to more than 500 acres. Slope is less than 1 percent.

Typically, the surface layer is brown, very strongly acid silt loam about 5 inches thick. The subsurface layer is light brownish gray, mottled, very strongly acid silt loam about 24 inches thick. The subsoil to a depth of about 63 inches is light brownish gray, very strongly acid silt loam and silty clay loam. In places the lower part of the subsoil is mildly alkaline.

Included in mapping are a few small areas of soils similar to the Guyton soils except that they are moderately well drained or somewhat poorly drained. These soils are in slightly higher positions than the Guyton soils. Also included are a few small areas of Guyton soils in slightly higher positions, which do not flood frequently. These included soils make up about 15 percent of the map unit.

This Guyton soil has low fertility. High levels of exchangeable aluminum in the rooting zone are potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate and ponds in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface during the months of December through May. This soil is subject to flooding during prolonged, intense storms. Floodwaters typically are 1 to 5 feet deep, but the depth exceeds 10 feet in places. Flood duration ranges from 7 days to 1 month. This soil has a low shrink-swell potential. Plants generally suffer from a lack of water during dry periods in summer and fall of most years.

Most of the acreage is used for woodland and pasture. A small acreage is used for cultivated crops.

This soil is well suited to the production of red oak, sweetgum, water oak, and loblolly pine. The site index for loblolly pine ranges from 85 to 90. The main management concerns in producing and harvesting timber are flooding and wetness. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through May. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is poorly suited to pasture. The main limitations are flooding and wetness. In addition, this soil is droughty in summer of most years. Wetness in winter and spring limits the choice of plants and the period of grazing. Suitable pasture plants are common bermudagrass, singletary peas, and vetch. Grazing when the soil is wet puddles the surface layer and damages the plant community. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is poorly suited to cultivated crops. It is limited mainly by wetness that results from frequent flooding and a seasonal high water table. Toxic levels of exchangeable aluminum can also be limiting. If the soil is drained and protected from flooding, most climatically adapted crops can be grown. Most crops and pasture plants respond well to fertilizers. Lime is generally needed.

This soil is not suited to urban development. Wetness from frequent flooding and a seasonal high water table are severe limitations for buildings, local roads and streets, and most sanitary facilities. Major flood control structure and extensive local drainage systems are needed.

This Guyton soil is in capability subclass Vw and woodland group 2w9.

Ko—Kolin silt loam, 1 to 5 percent slopes. This is a gently sloping, moderately well drained soil on convex ridgetops and upper side slopes in the terrace uplands. Areas are irregular and range from 10 to more than 300 acres.

Typically, the surface layer is dark grayish brown, medium acid silt loam about 4 inches thick. The subsoil is strong brown, strongly acid silt loam and silty clay loam in the upper part. It is yellowish brown and strong brown, strongly acid and medium acid silty clay loam and silty clay to a depth of about 60 inches.

Included in mapping are a few small areas of the Gore and Vick soils. The Gore soils are in slightly lower positions than the Kolin soil and are more clayey in the upper part of the subsoil. The somewhat poorly drained

Figure 5.—A well managed stand of loblolly pine on Kolin silt loam, 1 to 5 percent slopes.

Vick soils are less sloping and are in slightly higher positions. These included soils make up about 15 percent of the map unit.

This Kolin soil has low fertility. High levels of exchangeable aluminum in the rooting zone are potentially toxic to most crops. Water and air move through this soil at a very slow rate. Water runs off the surface at a medium rate. A perched seasonal high water table is above the clayey part of the subsoil during the months of December through April. This soil has a high shrink-swell potential in the lower part of the subsoil. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Most of the acreage is used for woodland and pasture. A small acreage is used for cultivated crops and homesites.

This soil is well suited to the production of loblolly pine and shortleaf fine (fig. 5). The site index for loblolly pine ranges from 85 to 90. The main management concerns in producing and harvesting timber are wetness and a slight erosion hazard. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December through April. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, ball clover, and crimson clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is moderately well suited to cultivated crops. The main limitations are droughtiness and a moderate erosion hazard. Soybeans is the main crop; but cotton, corn, small grains, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Minimum tillage and terraces, diversions, and grassed waterways can be used to control erosion. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. All tillage should be on the contour or across the slope. Most crops respond to fertilizer and liming programs designed to overcome the low fertility and the high levels of aluminum.

This soil is moderately well suited to urban development. Wetness and slow permeability are moderate to severe limitations for buildings, local roads and streets, and most sanitary facilities. A perched seasonal high water table is above the clayey part of the subsoil, and drainage should be provided if buildings are constructed on this soil. Very slow permeability and the high water table increase the possibility of failure of septic tank absorption fields. Sewage lagoons or public sewer systems are needed if this soil is used for homesites.

This Kolin soil is in capability subclass IIIe and woodland group 3w8.

La—Latanier clay. This is a level, somewhat poorly drained soil in intermediate positions on the natural levees of the Red River and its distributaries. Flooding from streams is controlled in most places by manmade levees. Areas are long and narrow and range from 20 to 700 acres. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, neutral clay about 5 inches thick. The subsoil is dark reddish brown and reddish brown, mildly alkaline and moderately alkaline clay. Below this is a buried surface layer of brown, moderately alkaline silt loam about 8 inches thick. The next layer to a depth of about 60 inches is yellowish red, moderately alkaline silt loam and very fine sandy loam.

Included in mapping are a few small areas of the Gallion, Moreland, and Norwood soils. The well drained Gallion and Norwood soils are in slightly higher positions than the Latanier soil. The Moreland soils are in lower positions and are clayey throughout. These included soils make up about 10 percent of the map unit.

This Latanier soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table is at a depth of 1 to 3 feet during the months of December through April. Flooding by backwaters is rare, but it can occur during periods of prolonged, intense rainfall. The surface layer is very sticky when wet and very hard when dry. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness, poor tilth, and very slow permeability. Soybeans is the main crop; but rice, cotton, corn, sugarcane, and small grains are also suitable crops. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if farmed when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing improve surface drainage, allow for more uniform application of irrigation water, and permit more efficient use of farm equipment. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help maintain soil tilth and content of organic matter. Crops respond well to nitrogen fertilizer. Lime is generally not needed.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, tall fescue, johnsongrass, ryegrass, and white clover. The main limitations of this soil are wetness and poor tilth. Excess surface water can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer is needed for grasses grown alone. Lime is generally not needed.

This soil is well suited to the production of southern hardwoods. The main management concern in producing and harvesting timber is wetness, which limits the use of equipment and causes seedling mortality unless drainage is provided. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to April. Only trees that can tolerate seasonal wetness should be planted. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is poorly suited to urban development. Wetness, flooding, very slow permeability, and very high shrink-swell potential are severe limitations to use of this soil for buildings, local roads and streets, and most sanitary facilities. Drainage is needed if roads and buildings are constructed. Excess water can be removed by shallow ditches and proper grading. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods.

This Latanier soil is in capability subclass IIIw and woodland group 2w6.

Ln—Latanier clay, occasionally flooded. This is a level, somewhat poorly drained soil in intermediate positions on the natural levees of the Red River and its distributaries. It is subject to occasional flooding for brief periods. Areas are long and narrow and range from 20 to more than 200 acres. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, moderately alkaline clay about 6 inches thick. The subsoil is dark reddish brown, moderately alkaline clay. The underlying material to a depth of about 60 inches is reddish brown and yellowish red silt loam and very fine sandy loam.

Included in mapping are a few small areas of the Gallion, Moreland, and Norwood soils. The well drained Gallion and Norwood soils are in slightly higher positions than the Latanier soil. The Moreland soils are in lower positions and are clayey throughout. These included soils make up about 10 percent of the map unit.

This Latanier soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table is at a depth of 1 foot to 3 feet during the months of December through April. This soil is subject to brief periods of flooding in winter, spring, and early summer. Floodwaters typically are 1 to 3 feet deep, but the depth exceeds 10 feet in places. The surface layer is very sticky when wet and very hard when dry. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland.

This soil is moderately well suited to cultivated crops. It is limited mainly by flooding, wetness, and poor tilth. The main crops are soybeans and grain sorghum. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if farmed when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing improve surface drainage and permit more efficient use of farm equipment.

This soil is moderately well suited to pasture. The main limitations are flooding and wetness. A suitable pasture plant is common bermudagrass. Excess surface water can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed for optimum production of forage. Lime is generally not needed. During periods of flooding, cattle need to be moved to adjacent protected areas or to pastures at higher elevations.

This soil is well suited to the production of southern hardwoods. The main management concerns in producing and harvesting timber are flooding, limited use of equipment, and seedling mortality. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to April unless drainage is provided. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness should be planted. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is poorly suited to urban development. Flooding, wetness, very slow permeability, and very high shrink-swell potential are severe limitations to use of this soil for buildings, local roads and streets, and most sanitary facilities. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This Latanier soil is in capability subclass IVw and woodland group 2w6.

Lo—Loring silt loam, 0 to 2 percent slopes. This is a nearly level, moderately well drained soil on convex ridgetops in the terrace uplands. Areas are irregular and range from 5 to 50 acres.

Typically, the surface layer is dark brown, medium acid silt loam about 6 inches thick. The subsoil is brown, medium acid and strongly acid silt loam. The next layer to a depth of about 61 inches is a fragipan of mottled, brown, strongly acid and medium acid silt loam. In places the fragipan is yellowish red.

Included in mapping are a few small areas of the Coteau and Memphis soils. The somewhat poorly drained Coteau soils are in slightly lower positions than the Loring soil. The well drained Memphis soils are in slightly higher positions and are on side slopes. These included soils make up about 10 percent of the map unit.

This Loring soil has medium fertility. Water and air move through the upper part of it at a moderate rate and through the lower part at a moderately slow rate. Effective rooting depth is about 25 inches. Plant root development and available water capacity are limited by the fragipan. Water runs off the surface at a slow rate. A perched seasonal high water table is above the fragipan during the months of December through March. The soil dries quickly after rains. It has a low shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This soil is well suited to cultivated crops. The main limitation is droughtiness. Sweet potatoes is the main crop, but soybeans, cotton, Irish potatoes, corn, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. The content of organic matter can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crusting of the surface layer and compaction of the soil can be reduced by returning the crop residue to the soil and by using minimum tillage. Most crops and pasture plants respond well to lime and fertilizer. Where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of some years.

This soil is well suited to pasture. The main limitation is droughtiness. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods and pine. This soil has few limitations for the use. After harvesting, however, reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to urban development. It has moderate limitations for buildings, local roads and streets, and most sanitary facilities. The main limitation is wetness. A perched seasonal high water table is above the fragipan, and drainage should be provided if buildings are constructed on this soil. Excess water can be removed by shallow ditches and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly during rainy periods because of the seasonal high water table and moderately slow permeability.

This Loring soil is in capability class I and woodland group 2o7.

Lr—Loring silt loam, 2 to 5 percent slopes. This is a gently sloping, moderately well drained soil on side slopes in the terrace uplands. Areas are irregular and range from 10 to 100 acres.

Typically, the surface layer is dark brown, very strongly acid silt loam about 6 inches thick. The subsoil is brown, very strongly acid silty clay loam and silt loam. The next layer to a depth of about 65 inches is a fragipan of mottled, brown silt loam. In places the subsoil is yellowish red.

Included in mapping are a few small areas of the Memphis soils and areas of the Loring soils that have slopes of less than 2 percent. The well drained Memphis soils are in slightly higher positions than the Loring soil. Also included on some of the lower side slopes are a few small outcrops of clayey materials. These included soils make up about 10 percent of the map unit.

This Loring soil has medium fertility. Water and air move through the upper part of it at a moderate rate and through the lower part at a moderately slow rate. Effective rooting depth is about 22 inches. Plant root development and available water capacity is limited by the fragipan. Water runs off the surface at a medium rate. A perched water table is above the fragipan during the months of December through March. This soil dries quickly after rains. It has a low shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This soil is well suited to cultivated crops. It is limited mainly by a moderate erosion hazard and droughtiness. Sweet potatoes is the main crop; but soybeans, cotton, Irish potatoes, corn, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Maintaining crop residue on or near the surface reduces runoff and helps conserve moisture and maintain soil tilth and organic matter content. Minimum tillage, terraces, diversions, and grassed waterways help control erosion. Drop structures placed in grassed waterways help prevent gullying. All tillage should be on the contour or across the slope. Most crops and pasture plants respond well to lime and fertilizer. Where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of some years.

This soil is well suited to pasture. The main limitation is droughtiness. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. Maintaining a good vegetative cover controls erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to woodland; however, only a few areas remain in native pine and hardwoods. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to urban development. It has moderate limitations for buildings, local roads and streets, and most sanitary facilities. The main limitation is wetness. A perched seasonal high water table is above the fragipan, and drainage should be provided if buildings are constructed on this soil. Unless internal drainage is improved, septic tank absorption fields will not function properly during rainy periods because of the seasonal high water table and moderately slow permeability.

This Loring soil is in capability subclass IIe and woodland group 2o7.

Ma—McKamie silt loam, 5 to 12 percent slopes. This is a moderately sloping to strongly sloping, well drained soil on side slopes along drainageways in the terrace uplands. Areas are long and narrow and range from 10 to 150 acres. Many well-defined drainageways dissect most areas.

Typically, the surface layer is dark grayish brown and dark brown, strongly acid silt loam about 6 inches thick. The subsoil is red and yellowish red, strongly acid silty clay in the upper part and yellowish red, medium acid silty clay loam in the lower part. The underlying material to a depth of about 71 inches is stratified, reddish brown and yellowish red silt loam and silty clay loam.

Included in mapping are a few small areas of the Gore, Buyton, and Kolin soils. The moderately well drained Gore soils are on the upper parts of the slopes. The poorly drained Guyton soils are in drainageways. The moderately well drained Kolin soils are on ridgetops and upper side slopes. Also included, in some places, are a few small areas of the severely eroded McKamie soils. These included soils make up about 15 percent of the map unit.

This McKamie soil has low fertility. Moderately high levels of exchangeable aluminum in the rooting zone are potentially toxic to most crops. Water and air move through this soil at a very slow rate. Runoff is rapid, and the hazard of water erosion is severe. This soil has a high shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of most years.

This soil is used mainly for woodland. It is also used for pasture and cultivated crops.

This soil is moderately well suited to the production of loblolly pine and shortleaf pine. The site index for loblolly pine ranges from 80 to 85. The main management concerns in producing and harvesting timber are equipment use limitations and difficulty in establishing seedlings. Because the clayey subsoil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Gullies also limit the use of equipment in places. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is moderately well suited to pasture. The main limitations are complex slopes, a severe erosion hazard during seedbed preparation, and droughtiness. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, and crimson clover. Erosion can be controlled by maintaining a good vegetative cover. Seedbed preparation should be on the contour or across the slope where practical. The use of equipment is limited by strongly sloping, complex slopes and by gullies. Fertilizer and lime are needed for optimum growth of grasses and legumes.

The McKamie soil is poorly suited to cultivated crops. It is limited mainly by short, complex slopes, a severe erosion hazard, droughtiness, and toxic levels of exchangeable aluminum. Irregular slopes can hinder tillage operations. Crop residue left on or near the surface helps to conserve moisture, maintain tilth, and control erosion. Minimum tillage, terraces, diversions, and grassed waterways can also be used to control erosion. All tillage should be on the contour or across the slope. Most crops respond to fertilizer and liming programs designed to overcome the low fertility and the moderately high levels of aluminum in the rooting zone.

This soil is poorly suited to urban development. Short, steep slopes, high shrink-swell potential, and very slow permeability are severe limitations for buildings, local roads and streets, and most sanitary facilities. Structures to divert runoff are needed if buildings and roads are constructed on this soil. Revegetating disturbed areas around construction sites as soon as possible helps to control soil erosion. Roads should be graded and cut and drainageways vegetated to control surface runoff and erosion. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons or public sewer systems should be used if the soil is used for homesites.

This McKamie soil is in capability subclass VIe and woodland group 3c2.

Me—Memphis silt loam, 0 to 2 percent slopes. This is a nearly level, well drained soil on convex ridgetops in the terrace uplands. Areas are irregular and range from 5 to 50 acres.

Typically, the soil is brown, medium acid and strongly acid silt loam and silty clay loam to a depth of about 68 inches.

Included in mapping are a few small areas of the Calhoun, Coteau, and Loring soils. The poorly drained Calhoun soils are in slight depressions and drainageways. The somewhat poorly drained Coteau soils are at the heads of drainageways. The moderately well drained Loring soils are in slightly lower positions than the Memphis soil.

This Memphis soil has medium fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate. Effective rooting depth is 60 inches or more. This soil dries quickly after rains. The shrink-swell potential is low. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This soil is well suited to cultivated crops. Soybeans is the main crop; but sweet potatoes, cotton, Irish potatoes, corn, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crusting of the surface layer and compaction of the soil can be reduced by returning the crop residue to the soil and using minimum tillage. Most crops and pasture plants respond well to lime and fertilizer. Where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of some years.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ball clover, and crimson clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to woodland. It has few limitations for this use; however, only a few areas remain in native pine and hardwoods.

This soil is well suited to urban development. Low strength, moderate permeability, and seepage are slight to moderate limitations for buildings and most sanitary facilities and severe limitations for local roads and streets. Septic tank absorption fields may not function properly in this soil during rainy periods because of the moderate permeability, but this limitation can be overcome by increasing the size of the absorption field. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Memphis soil is in capability class I and woodland group 1o7.

Mh—Memphis silt loam, 2 to 5 percent slopes. This is a gently sloping, well drained soil on side slopes in the terrace uplands. Areas are long and narrow and range from 10 to 100 acres.

Typically, the soil is brown, medium acid and strongly acid silt loam and silty clay loam to a depth of about 72 inches.

Included in mapping are a few small areas of the Loring soils. The Loring soils are moderately well drained and similar in position to the Memphis soils. These included soils make up about 10 percent of the map unit.

This Memphis soil has medium fertility. Water and air move through it at a moderate rate. Water runs off the surface at a medium rate. Effective rooting depth is 60 inches or more. This soil dries quickly after rains. It has a low shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for homesites.

This soil is well suited to cultivated crops. It is limited mainly by a moderate erosion hazard. Soybeans is the main crop; but sweet potatoes, cotton, Irish potatoes, corn, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. In places irregular slopes hinder tillage operations. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Maintaining crop residue on or near the surface reduces runoff and helps maintain soil tilth and organic matter content. Minimum tillage, terraces, diversions, and grassed waterways help to control erosion. Drop structures can be installed in grassed waterways to control gullying. All tillage should be on the contour or across the slope. Most crops and pasture plants respond well to fertilizer. Lime is generally needed.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, ball clover, and crimson clover. Erosion can be controlled by maintaining a good vegetative cover. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is well suited to woodland. It has few limitations for this use; however, only a few areas remain in native pine and hardwoods.

This soil is well suited to urban development. Low strength, moderate permeability, and seepage are slight to moderate limitations for buildings and most sanitary facilities and severe limitations for local roads and streets. Septic tank absorption fields will not function properly in this soil during rainy periods because of moderate permeability. This limitation can be overcome by increasing the size of the absorption field. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Memphis soil is in capability subclass IIe and woodland group 1o7.

Mm—Memphis silt loam, 8 to 20 percent slopes. This is a moderately steep, well drained soil on the escarpment between the terrace uplands and the alluvial plain and along major entrenched drainageways in the terrace uplands. Areas are mostly long and narrow. Many well-defined drainageways dissect most areas.

Typically, the surface layer is dark brown, medium acid silt loam about 5 inches thick. The subsoil to a depth of about 60 inches is brown, strongly acid silty clay loam in the upper part and brown, strongly acid silt loam in the lower part. In some places the subsoil is yellowish brown clay between depths of 40 and 60 inches. In other places most of the surface layer has been removed by erosion.

Included in mapping are a few small areas of the Calhoun and Loring soils and areas of Memphis soils that have slopes of less than 8 percent. The poorly drained Calhoun soils are in drainageways. The Loring soils are on upper side slopes and have a fragipan in the subsoil. Also included on some of the lower slopes are small outcrops of clayey and sandy materials. These included soils make up about 15 percent of the map unit.

This Memphis soil has medium fertility. Water and air move through it at a moderate rate. Runoff is rapid, and the hazard of water erosion is severe. This soil dries quickly after rains. It has a low shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of most years.

Most of the acreage is used for woodland and pasture. A small acreage is used for cultivated crops.

This soil is well suited to the production of loblolly pine, cherrybark oak, and yellow-poplar. The main management concerns in producing and harvesting timber are the severe erosion hazard and plant competition during reforestation. Minimizing the risk of erosion is essential in harvesting timber. Roads and landings can be protected from erosion by constructing diversions and by seeding cuts and fills. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is poorly suited to pasture. The main limitations are droughtiness and the severe erosion hazard when the soil is not covered by vegetation. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ball clover, and crimson clover. Seedbed preparation should be on the contour or across the slope where practical. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This unit is poorly suited to cultivated crops. It is limited mainly by the short, complex slopes; a severe erosion hazard; and droughtiness. The main crop is soybeans. Moderately steep and irregular slopes hinder tillage operations. All tillage should be on the contour or across the slope. Minimum tillage, terraces, diversions, and grassed waterways can be used to control erosion. Maintaining crop residue on or near the surface reduces runoff and helps maintain soil tilth and organic matter content. Crops respond well to lime and fertilizer.

This soil is moderately well suited to urban development. The main limitations are complex slopes and the severe erosion hazard during construction. Preserving the existing plant cover during construction helps to control erosion. Plans for homesite development should provide for the preservation of as many trees as possible. Plant cover can be established and maintained by proper shaping, fertilizing, seeding, and mulching of the slopes. The steepness of slope is also a concern in installing septic tank absorption fields. Absorption lines should be installed on the contour. Access roads must be designed to control surface runoff and help stabilize cut slopes.

This Memphis soil is in capability subclass VIe and woodland group 1o7.

Mo—Moreland silt loam. This is a level, somewhat poorly drained soil in low positions on the natural levees of the Red River and its distributaries. This soil is protected from flooding by large earthen levees. Areas are long and narrow and range from 20 to 150 acres. Slope is less than 1 percent.

Typically, the surface layer is reddish brown, mildly alkaline silt loam about 10 inches thick. The subsoil to a depth of about 60 inches is dark reddish brown and reddish brown, moderately alkaline silty clay. In places the surface layer is silty clay loam.

Included in mapping are a few small areas of the Latanier and Norwood soils. The Latanier soils are in slightly higher positions than the Moreland soil and are underlain by loamy materials. The well drained Norwood soils are also on higher positions and are loamy throughout. These included soils make up about 10 percent of the map unit.

This Moreland soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. A seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface during the months of December through April. Flooding is rare, but the soil is flooded by backwaters during unusual periods of prolonged, intense rainfall. The subsoil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness and very slow permeability. The main crop is soybeans; but cotton, rice, sugarcane, and grain sorghum are also suitable crops. This soil is generally easy to keep in good tilth; however, tilth is more difficult to maintain where the clayey subsoil has been mixed into the plow layer. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing remove excess water. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate.

This soil is well suited to pasture. The main limitations are wetness and very slow permeability. Suitable pasture plants are common and improved bermudagrass, tall fescue, Pensacola bahiagrass, johnsongrass, ryegrass, and white clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed where grasses are grown alone. Lime is generally not needed.

This soil is well suited to the production of southern hardwoods; however, only a few areas remain in native hardwoods. Wetness is a severe limitation for equipment use. Trees should be water tolerant, and they should be planted or harvested during dry periods. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is poorly suited to urban development. Wetness, flooding, low strength, and very high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Drainage is needed if roads and buildings are constructed on the soil. Streets and roads should be designed to offset the limited ability of this soil to support a load and to prevent structural damage caused by shrinking and swelling. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons or public sewer systems should be used if this soil is used for homesites.

This Moreland soil is in capability subclass IIIw and woodland group 2w6.

Mr—Moreland silt loam, occasionally flooded. This is a level, somewhat poorly drained soil in low positions on the natural levees of the Red River and its distributaries. It is subject to occasional flooding for brief to long periods. Areas are long and narrow and range from 20 to 150 acres. Slope is less than 1 percent.

Typically, the surface layer is reddish brown, mildly alkaline silt loam about 10 inches thick. The subsoil to a depth of about 60 inches is dark reddish brown and reddish brown, moderately alkaline clay. In places the surface layer is silty clay loam.

Included in mapping are a few small areas of the Latanier and Norwood soils. The Latanier soils are in slightly higher positions than the Moreland soil and are underlain by loamy materials. The well drained Norwood soils are also in slightly higher positions and are loamy throughout. These included soils make up about 10 percent of the map unit.

This Moreland soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. A seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface during the months of December through April. This soil is subject to brief to long periods of flooding during the months of December through June of some years. This soil has a very high shrink-swell potential in the subsoil. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland.

This soil is moderately well suited to cultivated crops. It is limited mainly by flooding, wetness, and very slow permeability. The main crops are soybeans and grain sorghum. This soil is somewhat difficult to keep in good tilth because the clayey subsoil is mixed into the plow layer in most places. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing remove excess surface water; however, grading may also remove the loamy surface layer in some places. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate.

This soil is moderately well suited to pasture. The main limitations are flooding and wetness. The main pasture plant is common bermudagrass. Livestock must be moved to protected areas during periods of flooding. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is well suited to the production of southern hardwoods; however, only a few areas remain in native hardwoods. Wetness and flooding are severe limitations for equipment use. Trees should be water tolerant, and they should be planted or harvested during dry periods.

This soil is poorly suited to urban development. Flooding, wetness, low strength, and very high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Flooding can be controlled by the use of major flood control structures. Drainage is needed if roads and buildings are constructed on this soil. Streets and roads should be designed to offset the limited ability of this soil to support a load and to prevent structural damage caused by shrinking and swelling. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons or public sewer systems are needed if this soil is used for homesites.

This Moreland soil is in capability subclass IVw and woodland group 3w5.

Ms—Moreland clay. This is a level, somewhat poorly drained soil in low positions on the natural levees of the Red River and its distributaries. Flooding from steams is controlled in most places by manmade levees. Areas range from about 50 to 5,000 acres. Slope is less than 1 percent.

Typically, the soil is dark reddish brown and reddish brown, neutral to moderately alkaline clay to a depth of about 60 inches. In places the underlying material is gray or grayish brown silt loam, silty clay loam, or clay between depths of 40 and 60 inches.

Included in mapping are a few small areas of the Latanier and Norwood soils. The Latanier soils are in slightly higher positions than the Moreland soil and are underlain by loamy materials. The well drained Norwood soils are also in high positions and are loamy throughout. These included soils make up about 10 percent of the map unit.

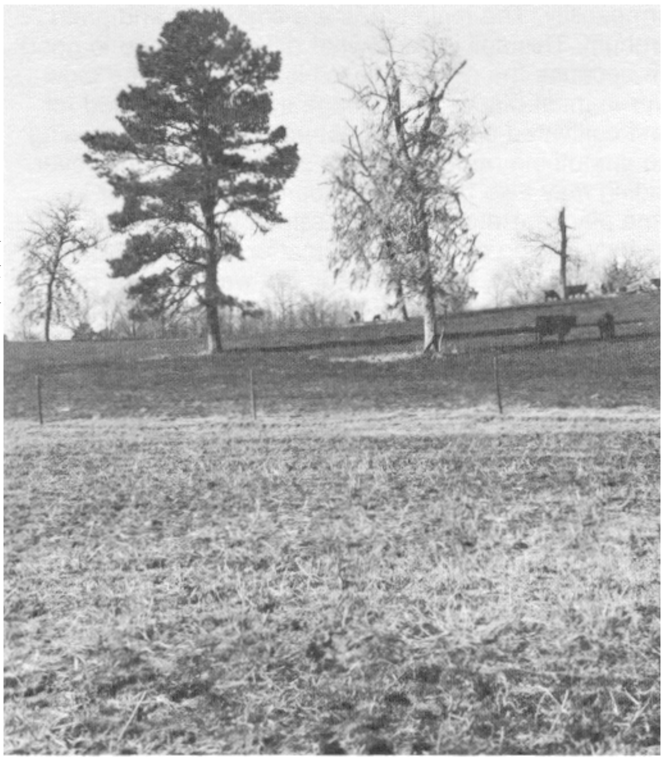


Figure 6.—The residue provided by wheat stubble increases the organic matter in this Moreland clay soil. The pasture in the background is on Memphis silt loam, 2 to 5 percent slopes.

This Moreland soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface during the months of December through April. Flooding is rare, but it can occur from backwaters during periods of unusually prolonged, intense rainfall. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness, very slow permeability, and poor tilth. Soybeans is the main crop; but cotton, rice, sugarcane, and small grains are also suitable crops. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content, and it becomes cloddy if farmed when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing also improve surface drainage and permit more efficient use of farm equipment. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate (fig. 6).

This soil is well suited to pasture. The main limitations are wetness and very slow permeability. Suitable pasture plants are common and improved bermudagrass, tall fescue, Pensacola bahiagrass, johnsongrass, ryegrass, and white clover. Excess surface water can be removed by shallow ditches. Grazing when the soil is wet causes compaction of the surface layer and damage to the plant community. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed where grasses are grown alone. Lime is generally not needed.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods. Wetness and the clayey surface layer severely limit the use of equipment. Only water-tolerant trees should be planted, and they should be planted and harvested during dry periods.

This soil is poorly suited to urban development. Wetness, flooding, low strength, and very high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Drainage is needed if roads and buildings are constructed on this soil. Excess water can be removed by shallow ditches and proper grading. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons or public sewer systems should be constructed if this soil is used for homesites.

This Moreland soil is in capability subclass IIIw and woodland group 2w6.

Mt—Moreland clay, occasionally flooded. This is a level, somewhat poorly drained soil in low positions on the natural levees of the Red River and its distributaries. It is subject to occasional flooding for brief to long periods. Areas range from about 15 to 1,500 acres. Slope is less than 1 percent.

Typically, the soil is dark reddish brown and reddish brown, mildly alkaline and moderately alkaline clay to a depth of about 60 inches. In places the underlying material is gray or grayish brown silt loam, silty clay loam, or clay between depths of 40 and 60 inches.

Included in mapping are a few small areas of the Latanier and Norwood soils. The Latanier soils are in slightly higher positions than the Moreland soil and are underlain by loamy material. The well drained Norwood soils are also in higher positions and are loamy throughout. These included soils make up about 10 percent of the map unit.

This Moreland soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface during the months of December through April. This soil is subject to brief to more-than-a-month-long periods of flooding in winter, spring, and early summer of some years. Floodwaters typically are 1 to 3 feet deep, but the depth exceeds 10 feet in places. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for woodland and cultivated crops. A small acreage is used for pasture.

This soil is well suited to the production of southern hardwoods. The main management concerns in producing and harvesting timber are wetness and flooding, which limit the use of equipment and cause seedling mortality. Because this clayey soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Only trees that can tolerate seasonal wetness should be planted. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to cultivated crops. It is limited mainly by flooding, wetness, and poor tilth. The main crops are soybeans and grain sorghum. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if farmed when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Land grading and smoothing improve surface drainage and permit more efficient use of farm equipment.

This soil is moderately well suited to pasture. The main limitations are flooding and wetness. The main suitable pasture plant is common bermudagrass. During flood periods, cattle need to be moved to adjacent protected areas or to pastures at high elevations. Excess surface water can be removed by shallow ditches if suitable outlets are available. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is poorly suited to urban development. Flooding, wetness, low strength, and very high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Major flood control structures and extensive local drainage systems are needed to protect this map unit from flooding. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons or public sewer systems are needed if this soil is used for homesites.

This Moreland soil is in capability subclass IVw and woodland group 3w6.

Mu—Moreland clay, gently undulating, occasionally flooded. This is a gently undulating, somewhat poorly drained soil on low ridges and in swales of the Red River alluvial plain. The ridges are 1 to 3 feet high and 100 to 250 feet wide. The swales are about 75 to 150 feet wide. This soil is subject to occasional flooding for brief to long periods. Areas range from about 200 to more than 700 acres. Slopes are short and choppy and range from 0 to 3 percent.

Typically, the soil is dark reddish brown and reddish brown, mildly alkaline and moderately alkaline clay and silty clay to a depth of about 60 inches. In places the underlying material is gray or grayish brown silt loam, silty clay loam, or clay between depths of 40 and 60 inches.

Included in mapping are a few small areas of the Latanier and Norwood soils. The Latanier soils are in slightly higher positions than the Moreland soil and are underlain by loamy materials. The well drained Norwood soils are also in higher positions and are loamy throughout. Also included are a few small areas of Moreland soils that have slopes of more than 3 percent.

This Moreland soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and ponds in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface during the months of December through April. This soil is subject to brief to more-than-a-month-long periods of flooding in winter, spring, and early summer. Floodwaters typically are 1 to 3 feet deep, but the depth exceeds 10 feet in places. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for woodland and cultivated crops. A small acreage is used for pasture.

This soil is well suited to the production of southern hardwoods. The main management concerns in producing and harvesting timber are wetness and flooding, which limit the use of equipment and cause seedling mortality. Because the clayey soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Only trees that can tolerate seasonal wetness should be planted. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants.

This soil is moderately well suited to cultivated crops. It is limited mainly by flooding, wetness, poor tilth, and short, choppy slopes. The main crops are soybeans and grain sorghum. This soil is sticky when wet and hard when dry and becomes cloddy if farmed when too wet or too dry. Flooding can be controlled by levees, dikes, and pumps. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing also improve surface drainage, but in places large volumes of soil must be moved. Tilth and fertility can be improved by returning crop residue to the soil.

This soil is moderately well suited to pasture. The main limitations are flooding and wetness. The main pasture plant is common bermudagrass. During flood periods, cattle need to be moved to adjacent protected areas or to pastures at higher elevations. Excess surface water can be removed by shallow ditches if suitable outlets are available. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is poorly suited to urban development. Flooding, wetness, low strength, and very high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Major flood control structures and extensive local drainage systems are needed to protect this map unit from flooding. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons or public sewer systems are needed if this soil is used for homesites.

This Moreland soil is in capability subclass IVw and woodland group 3w6.

Mw—Moreland clay, frequently flooded. This is a level, somewhat poorly drained soil in low positions on the natural levees of former and present day distributary channels of the Red River. It is subject to frequent flooding for brief to long periods. Areas range from about 20 to 500 acres. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, slightly acid clay about 12 inches thick. The subsoil to a depth of about 60 inches is dark reddish brown, moderately alkaline clay and silty clay.

Included in mapping are a few small areas of the Latanier and Sharkey soils. The Latanier soils are in slightly higher positions that the Moreland soil and are underlain by loamy materials. The Sharkey soils are in lower positions and have a gray subsoil. Also included are a few small areas of soils similar to the Moreland soil except that they are ponded throughout the year. These included soils make up about 10 percent of the map unit.

This Moreland soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a very slow rate and ponds in low places for long periods after heavy rains. This soil is subject to one or more brief to more-than-a month-long periods of flooding during the months of December through June of most years. Depth of floodwater may exceed 10 feet at the lower elevations, but is typically 1 to 3 feet deep. During the nonflood periods of December through April, a seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface. The surface layer is very sticky when wet and dries slowly. This soil has a very high shrink-swell potential.

Most of the acreage is in woodland and used for wildlife habitat.

This soil is moderately well suited to woodland. The main management concerns in producing and harvesting timber are wetness and frequent flooding. Suitable trees for planting are baldcypress and green ash.

This soil is poorly suited to cultivated crops. It is limited mainly by wetness and frequent flooding. Crops are damaged by floodwaters in most years.

This soil is poorly suited to pasture. Flooding and a seasonal high water table limit the choice of plants and grazing period. The main pasture plant is common bermudagrass. Cattle need to be moved to pasture at higher elevations during flood periods.

This soil is not suited to urban development. Wetness and flooding are severe limitations for this use. Flooding can be controlled only by the use of major flood control structures and surface drainage systems.

This Moreland soil is in capability subclass Vw and woodland group 3w6.

Nd—Norwood silt loam. This is a level, well drained soil in high positions on the natural levees of the Red River and its distributaries. Areas are long and narrow and range from 10 to more than 400 acres. Most areas of this soil are protected from flooding by levees. Slope is less than 1 percent.

Typically, the soil is reddish brown, mildly alkaline and moderately alkaline silt loam and silty clay loam to a depth of about 65 inches. Between depths of about 65 and 80 inches, it is yellowish red, stratified very fine sandy loam and silt loam.

Included in mapping are a few small areas of the Roxana soils. The Roxana soils are in slightly higher positions than the Norwood soil and contain less clay in the underlying material. These included soils make up about 10 percent of the map unit.

This Norwood soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate. Effective rooting depth is 60 inches or more. This soil dries quickly after rains. It has a low shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops. A small acreage is used for homesites and pasture.

This soil is well suited to cultivated crops. It has few limitations. Soybeans is the main crop; but cotton, sugarcane, corn, small grains, and vegetables are also suitable crops (fig. 7). This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets remove excess surface water. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. The organic matter content can be maintained by using all crop

Figure 7.—Norwood silt loam is well suited to cultivated crops, including soybeans and sugarcane.

residue, plowing under cover crops, and using a suitable cropping system. Crusting of the surface and compaction of the soil can be reduced by returning the crop residue to the soil and by using minimum tillage.

This soil is well suited to pasture. It has few limitations. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, johnsongrass, ryegrass, tall fescue, and white clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed where grasses are grown alone. Lime is generally not needed.

This soil is well suited to woodland. Its potential for production of hardwoods is high; however, only a few areas of native hardwoods remain.

This soil is moderately well suited to urban development. It has slight limitations for buildings and moderate limitations for some sanitary facilities. Low strength is a severe limitation for local roads and streets. Septic tank absorption fields will not function properly in this soil during rainy periods because of moderate permeability. This limitation can be overcome by increasing the size of the absorption field.

This Norwood soil is in capability class I and woodland group 1o4.

No—Norwood silt loam, occasionally flooded. This is a level, well drained soil in high positions on the natural levees of the Red River and its distributaries. It is subject to occasional flooding. Areas are long and narrow and range from 20 to more than 300 acres. Slope is less than 1 percent.

Typically, the surface layer is reddish brown, moderately alkaline silt loam about 6 inches thick. The subsoil is reddish brown, moderately alkaline silt loam. The underlying material to a depth of about 60 inches is dark reddish brown and reddish brown, moderately alkaline silty clay loam and silt loam. In places the underlying material is clay between depths of 20 and 60 inches.

Included in mapping are a few small areas of the Roxana soils. The Roxana soils are in slightly higher positions and contain less clay throughout than the Norwood soils. These included soils make up about 10 percent of the map unit.

This Norwood soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate. This soil is subject to brief to long periods of flooding in the months of December through June of some years. Floods occur in approximately 2 out of 15 years during the crop growing season. This soil dries quickly after rains. It has a low shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland.

This soil is moderately well suited to cultivated crops. Crops are damaged by floodwaters in some years. The main crops are soybeans, cotton, corn, and small grains. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Excessive cultivation can result in the formation of a tillage pan, but this pan can be broken up by subsoiling when the soil is dry. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces surface crusting, and increases the water intake rate.

This soil is moderately well suited to pasture. Wetness from flooding is the main limitation. A suitable pasture plant is common bermudagrass; but improved bermudagrass, tall fescue, ryegrass, and white clover can be grown with good management. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and soil in good condition. Livestock must be moved to protected areas during flood periods.

This soil is well suited to production of southern hardwoods. It has few limitations for use and management. Trees suitable for planting are eastern cottonwoods.

This soil is poorly suited to urban development. The main limitations are wetness, flooding, and low strength. Flooding can be controlled only by the use of major flood control structures. Buildings and roads should be designed to offset the limited ability of the soil to support a load.

This Norwood soil is in capability subclass IIw and woodland group 1o4.

Nr—Norwood silty clay loam. This is a level, well drained soil in intermediate positions on the natural levees of the Red River and its distributaries. Areas are long and narrow and range from 10 to 300 acres. Most areas of this soil are protected from flooding by levees. Slope is less than 1 percent.

Typically, the surface layer is reddish brown, moderately alkaline silty clay loam about 4 inches thick. The underlying material to a depth of about 75 inches is reddish brown and yellowish red, moderately alkaline silty clay loam and silt loam.

Included in mapping are a few small areas of the Latanier soils. The Latanier soils are in slightly lower positions than the Norwood soil and have a clayey surface layer and subsoil. These included soils make up about 10 percent of the map unit.

This Norwood soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. Effective rooting depth is 60 inches or more. This soil dries slowly after heavy rains. It has a low shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops. A small acreage is used for pasture and homesites.

This soil is well suited to cultivated crops. It is limited mainly by wetness. Soybeans is the main crop; but cotton, sugarcane, corn, small grains, and vegetables are also suitable crops. This soil is somewhat difficult to keep in good tilth. It becomes cloddy if farmed when it is too wet or too dry. Proper row arrangement, field ditches, vegetated outlets, and land grading and smoothing remove excess surface water. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crusting of the surface and compaction of the soil can be reduced by returning the crop residue to the soil and by using minimum tillage.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, johnsongrass, tall fescue, ryegrass, and white clover. Excess surface water can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed where grasses are grown alone. Lime is generally not needed.

This soil is well suited to woodland. It has high production potential; however, only a few areas remain in native hardwoods. Suitable trees to plant are eastern cottonwood, American sycamore, and sweetgum.

This soil is moderately well suited to urban development. Moderate permeability and low strength are moderate limitations for buildings and most sanitary facilities and severe limitations for local roads and streets. Roads should be designed to offset the limited ability of the soil to support loads. Excess water can be removed by shallow ditches and proper grading. Septic tank absorption fields will not function properly on this soil during rainy periods because it has moderate permeability. This limitation can be overcome by increasing the size of the absorption field.

This Norwood soil is in capability subclass IIw and woodland group 1o4.

Nw—Norwood silty clay loam, occasionally flooded. This is a level, well drained soil in high positions on the natural levees of the Red River and its distributaries. It is subject to occasional flooding. Areas are long and narrow and range from 20 to more than 150 acres. Slope is less than 1 percent.

Typically, the surface layer is dark brown, moderately alkaline silty clay loam about 6 inches thick. The subsoil is reddish brown, moderately alkaline silty clay loam. The underlying material to a depth of about 60 inches is reddish brown, moderately alkaline silt loam and contains thin strata of very fine sandy loam and silty clay loam. In places the underlying material is clay between depths of 20 and 60 inches.

Included in mapping are a few small areas of the Latanier soils. The Latanier soils are in slightly lower positions than the Norwood soil and have a clayey surface layer and subsoil. These included soils make up about 10 percent of the map unit.

This Norwood soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. This soil is subject to brief to long periods of flooding during the months of December through June of some years. Flooding occurs approximately 2 years out of 15 during the crop growing season. This soil has a moderate shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland.

This soil is moderately well suited to cultivated crops. It is limited mainly by flooding. The main crops are cotton, corn, soybeans, and small grains. This soil is somewhat difficult to keep in good tilth and becomes cloddy if farmed when it is too wet or too dry. Land grading and smoothing remove excess surface water. Excessive cultivation can result in the formation of a tillage pan, but this pan can be broken up by subsoiling when the soil is dry. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate.

This soil is well suited to pasture. The main pasture plant is common bermudagrass; but improved bermudagrass, tall fescue, ryegrass, and white clover can also be grown with good management. Grazing when the soil is wet puddles the surface layer and damages the plant community. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Livestock must be moved to protected areas during flood periods.

This soil is well suited to the production of southern hardwoods. It has few limitations for use and management. Trees suitable for planting are eastern cottonwood, American sycamore, and sweetgum.

This soil is poorly suited to urban development. The main limitations are flooding, wetness, and low strength. Flooding can be controlled only by the use of major flood control structures. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Norwood soil is in capability subclass IIIw and woodland group 1o4.

Ra—Roxana very fine sandy loam. This is a level, well drained soil in high positions on the natural levees of the Red River. Areas are long and narrow and range from 20 to more than 500 acres. Most areas of this soil are protected from flooding by levees. Slope is dominantly less than 1 percent.

Typically, the surface layer is reddish brown, slightly acid very fine sandy loam about 5 inches thick. The underlying material to a depth of about 62 inches is stratified, yellowish red and reddish brown very fine sandy loam, loamy very fine sand, and silt loam. In places the surface layer is calcareous.

Included in mapping are a few small areas of the Norwood soils. The Norwood soils are in slightly lower positions than the Roxana soil and contain more clay in the underlying material. These included soils make up about 10 percent of the map unit.

This Roxana soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate. A seasonal high water table is at a depth of about 4 to 6 feet during the months of December to April of most years. Effective rooting depth is 60 inches or more. This soil dries quickly after rains. It has a low shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops. A small acreage is used for pasture and homesites.

This soil is well suited to cultivated crops. Soybeans is the main crop; but cotton, corn, sugarcane, small grains, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. The organic matter content can be maintained by using all crop residue, plowing under cover crops, and using a suitable cropping system. Crusting of the surface layer and compaction of the soil can be reduced by returning the crop residue to the soil and by using minimum tillage.

This soil is well suited to pasture. It has few limitations. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, johnsongrass, ryegrass, tall fescue, and white clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed where grasses are grown alone. Lime is generally not needed.

This soil is well suited to woodland. It has a very high production potential; however, only a few areas remain in native hardwoods. Suitable trees to plant are eastern cottonwood and American sycamore.

This map unit is well suited to urban development. It has slight to moderate limitations for buildings, local roads and streets, and most sanitary facilities. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of the water supplies as a result of seepage. Local roads and streets should be designed to offset the limited ability of the soil to support a load.

This Roxana soil is in capability class I and woodland group 1o4.

Rn—Roxana very fine sandy loam, gently undulating. This is a well drained soil on low, parallel ridges and in swales on the recent natural levees of the Red River. The ridges are 1 to 3 feet high and seldom exceed 200 feet in width. Flooding is controlled by the Red River levee. Areas are irregular and range from 50 to 1,000 acres. Slopes are generally short and range from 0 to 3 percent.

Typically, the surface layer is reddish brown, slightly acid very fine sandy loam about 5 inches thick. The underlying material to a depth of about 62 inches is yellowish red and reddish brown, neutral and moderately alkaline very fine sandy loam, loamy very fine sand, and silt loam. In places the surface layer is calcareous.

Included in mapping are a few small areas of the Norwood soils. The Norwood soils are in slightly lower positions and contain more clay in the underlying material than the Roxana soil. These included soils make up about 15 percent of the map unit.

This Roxana soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. A seasonal high water table is at a depth of 4 to 6 feet during the months of December to April. This soil dries quickly after rains. The shrink-swell potential is low. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland and homesites.

This soil is well suited to cultivated crops. It has few limitations, but the low ridges and swales interfere somewhat with tillage. The main crop is soybeans; but cotton, corn, sugarcane, grain sorghum, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Land grading and smoothing improve surface drainage and permit more efficient use of farm equipment, but a large amount of soil generally has to be moved. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Crop residue left on or near the surface helps conserve moisture, maintain tilth, and control erosion. Minimum tillage and winter cover crops will also reduce the amount of soil lost through erosion.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, tall fescue, johnsongrass, ryegrass, small grains, and white clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is well suited to the production of southern hardwoods. Suitable trees to plant are eastern cottonwood and American sycamore.

This soil is well suited to urban development. It has slight to moderate limitations for buildings, local roads and streets, and most sanitary facilities. Seepage is a limitation where this soil is used for sewage lagoons and sanitary landfills. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Roxana soil is in capability subclass IIe and woodland group 1o4.

Ro—Roxana very fine sandy loam, undulating. This is an undulating, well drained soil on parallel ridges and in swales on the natural levees of the Red River. The ridges are 3 to 6 feet high and seldom exceed 200 feet in width. Flooding is controlled by the Red River levee. Areas are irregular and range from 50 to 650 acres. Slopes are short and choppy and range from 3 to 5 percent.

Typically, the surface layer is yellowish red, mildly alkaline very fine sandy loam about 6 inches thick. The underlying material to a depth of about 63 inches is yellowish red, moderately alkaline loamy very fine sand and very fine sandy loam. In places the surface layer is calcareous.

Included in mapping are a few small areas of the Norwood soils. Also included are a few small areas of Roxana soils that have slopes steeper than 5 percent. The Norwood soils are in slightly lower positions than the Roxana soil and contain more clay in the underlying material. These included soils make up about 15 percent of the map unit.

This Roxana soil has high fertility. Water and air move through it at a moderate rate. A seasonal high water table is at a depth of about 4 to 6 feet during the months of December to April. Runoff is moderately rapid when the soil is saturated, and the hazard of water erosion is severe. This soil dries quickly after rains. Plants generally suffer from a lack of water during dry periods in summer and fall of most years.

This soil is used for cultivated crops, pasture, and woodland.

This soil is moderately well suited to crops. It is limited mainly by short, choppy slopes, droughtiness, and a severe erosion hazard. The main crop is soybeans; but cotton, corn, grain sorghum, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Irregular slopes hinder tillage operations. Land grading and smoothing reduce the amount of soil lost through erosion and permit more efficient use of farm equipment, but in places large volumes of earth need to be moved. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Crop residue left on or near the surface helps conserve moisture, maintain tilth, and control erosion. Minimum tillage and winter cover crops will also reduce soil loss caused by erosion.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, johnsongrass, tall fescue, ryegrass, small grains, and white clover. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed where grasses are grown alone. Lime is generally not needed.

This soil is well suited to the production of southern hardwoods; however, only a few areas of native hardwoods remain. Suitable trees to plant are eastern cottonwood and American sycamore.

This soil is well suited to urban development. It has slight to moderate limitations for buildings, local roads and streets, and most sanitary facilities. Seepage is a limitation where this soil is used for sewage lagoons and sanitary landfills. Local roads and streets should be designed to offset the limited ability of the soil to support a load.

This Roxana soil is in capability subclass IIIe and woodland group 1o4.

Ru—Roxana very fine sandy loam, gently undulating, occasionally flooded. This is a gently undulating, well drained soil on low, parallel ridges and in swales on the natural levees of the Red River and its distributaries. The ridges are 1 to 3 feet high and seldom exceed 200 feet in width. This soil is subject to occasional flooding for brief to long periods. Areas are long and narrow and range from 50 to more than 500 acres. Slopes are generally short and range from 0 to 3 percent.

Typically, the surface layer is reddish brown, moderately alkaline very fine sandy loam about 6 inches thick. The underlying material to a depth of about 64 inches is yellowish red and reddish brown, moderately alkaline very fine sandy loam and loamy very fine sand. In places the surface layer is calcareous.

Included in mapping are a few small areas of the Norwood soils. The Norwood soils are in slightly lower positions and contain more clay in the underlying material than the Roxana soils. These included soils make up about 10 percent of the map unit.

This Roxana soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. A seasonal high water table is at a depth of 4 to 6 feet during the months of December to April. This soil dries quickly after rains. The shrink-swell potential is low. This soil is subject to brief to long periods of flooding during the months of December through June of some years. Flooding occurs in approximately 2 years out of 15 during the crop growing season. An adequate supply of water is available to plants in most years.

Most of the acreage is used for woodland; however, it is rapidly being cleared and put into cultivation. A small acreage is used for pasture.

This soil is well suited to cultivated crops. It is limited mainly by occasional flooding. The main crops are soybeans, cotton, corn, and small grains. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Land grading and smoothing improve surface drainage and permit more efficient use of farm equipment. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Crop residue left on or near the surface helps conserve moisture, maintain tilth, and control erosion. Minimum tillage and winter cover crops also reduce soil loss caused by erosion.

This soil is well suited to pasture. Suitable pasture plants are common and improved bermudagrass, tall fescue, johnsongrass, ryegrass, and white clover. Proper grazing, weed control, and fertilizer are needed for maximum quality forage. Livestock must be moved to protected areas during flood periods.

This soil is well suited to the production of southern hardwoods. It has few limitations for use and management. Suitable trees for planting are eastern cottonwood and American sycamore.

This soil is poorly suited to urban development. The main limitations are flooding and low strength. Flooding can be controlled only by the use of major flood control structures. Streets and roads should be designed to offset the limited ability of the soil to support a load.

This Roxana soil is in capability subclass IIw and woodland group 1o4.

Rx—Roxana very fine sandy loam, frequently flooded. This is a level, well drained soil adjacent to the Red River. It consists of recent depositions. Areas are subject to frequent flooding, scouring, and further deposition. Areas are irregular and range from 15 to 150 acres. Slope is less than 1 percent.

Typically, the surface layer is reddish brown, moderately alkaline very fine sandy loam about 6 inches thick. The underlying material to a depth of about 60 inches is yellowish red and reddish brown, moderately alkaline silt loam and very fine sandy loam. In places the surface layer is calcareous.

Included in mapping are a few small areas of the Roxana soils that have undulating slopes. Also included are soils similar to the Roxana soil but more sandy. These areas make up about 10 percent of the map unit.

This Roxana soil has high fertility. Water and air move through it at a moderate rate. Water runs off the surface at a slow rate. This soil is subject to frequent brief to long periods of flooding from December through June of most years. Flooding is by rapidly flowing water that causes scouring and deposition. Areas of this soil are sometimes destroyed when banks are cut as the Red River changes its course. Depth of floodwater may exceed 10 feet. During nonflood periods a seasonal high water table is at a depth of 4 to 6 feet. An adequate supply of water is available to plants in most years.

Most of the acreage is in woodland and native pasture. The soil is limited mainly by frequent flooding and the subsequent scouring and deposition. It is poorly suited to cultivated crops.

This soil is poorly suited to pasture because of the flooding hazard. The main pasture plant is common bermudagrass. Livestock must be moved to protected areas during flood periods.

This soil is moderately well suited to woodland. Trees, such as eastern cottonwood, grow quickly on this soil, but they can be uprooted by rapidly flowing floodwaters.

This soil is not suited to urban development. The limitations of frequent flooding, scouring, and deposition are too severe for this use.

This Roxana soil is in capability subclass Vw and woodland group 2w5.

Sa—Sharkey clay. This is a level, poorly drained soil in low positions on the natural levees of old distributary channels of the Mississippi River. Most areas of this soil are protected from backwater flooding by the West Atchafalaya Basin levees. Areas range from about 50 to 1,500 acres. Slope is less than 1 percent.

Typically, the surface layer is dark gray, slightly acid clay about 6 inches thick. The subsoil is gray, mottled, slightly acid clay in the upper part and dark brown, mottled, neutral clay in the middle part. The lower part of the subsoil to a depth of about 60 inches is gray, mottled, neutral and mildly alkaline clay. In some places the subsoil is gray throughout. In other places the surface layer is silt loam or silty clay loam.

Included in mapping are a few small areas of the Baldwin and Tensas soils. The Baldwin soils are in slightly higher positions and contain less clay in the subsoil than the Sharkey soils. The Tensas soils are also in higher positions, and they are more acid and contain less clay in the subsoil than the Sharkey soils. These included soils make up about 10 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. Flooding is rare, but it can occur during periods of unusually prolonged, intense rainfall. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during the months of December through April. Some low-lying areas are subject to flooding from local run-in during prolonged, intense rainfall. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years. The surface layer is very sticky when wet and dries slowly.

Most of the acreage is used for woodland; however, it is rapidly being cleared for use as cropland. A small acreage is used for pasture.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness, very slow permeability, and poor tilth. The main crop is soybeans; but rice, corn, grain sorghum, and sugarcane are also suitable crops (fig. 8). This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improves fertility and helps maintain soil tilth and content of organic matter. Properly designed irrigation systems are needed for growing rice.

This soil is well suited to the production of southern hardwoods. Because the clayey soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Suitable trees for planting are eastern cottonwood, American sycamore, and sweetgum.

This soil is well suited to pasture. The main limitations are wetness and very slow permeability. Suitable pasture plants are common and improved bermudagrass, dallisgrass, tall fescue, johnsongrass, ryegrass, and white clover. Proper grazing, weed control, and fertilizer are needed for maximum quality forage. Lime is generally not needed for grasses.

This map unit is poorly suited to urban development. The main limitations are wetness, flooding, low strength, and very high shrink-swell potential. Excess water can be removed by shallow ditches and proper grading. Streets and roads should be designed to offset the limited ability of this soil to support a load and to prevent structural damage caused by shrinking and swelling. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons or public sewer systems are needed if this soil is used for homesites.

This Sharkey soil is in capability subclass IIIw and woodland group 2w6.

Se—Sharkey clay, overwash, occasionally flooded. This is a level, poorly drained soil in low positions on the natural levees of the Mississippi River and its distributaries. It is subject to occasional flooding for brief

Figure 8.—This Sharkey clay soil is well suited to rice. The levees allow an efficient and uniform application of irrigation water.

to very long periods. Areas range from about 50 to more than 1,500 acres. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, neutral clay about 12 inches thick. Below this is dark grayish brown, neutral clay about 11 inches thick. The subsoil is olive gray and gray, mottled, neutral and slightly acid clay. The underlying material to a depth of about 66 inches is gray, mottled silty clay loam.

Included in mapping are a few small areas of the Tensas soils. The somewhat poorly drained Tensas soils are in slightly higher positions than the Sharkey soils. Also included are a few small areas of Sharkey soils in swales that frequently flood. These included soils make up about 10 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. This soil is subject to brief to very long periods of flooding in winter, spring, and early summer. They may last for longer than a month. Floodwaters typically are 1 to 3 feet deep, but the depth exceeds 10 feet in places. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during the months of December through April. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

This soil is used mainly for cultivated crops and woodland. A small acreage is managed for wildlife habitat.

This soil is moderately well suited to cultivated crops. It is limited mainly by flooding, wetness, and poor tilth. The main crops are soybeans and grain sorghum. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if farmed when it is too wet or too dry. Flooding can be controlled by levees, dikes, and pumps. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Tilth and fertility can be improved by returning crop residue to the soil.

This soil is well suited to the production of southern hardwoods. The main management concerns in producing and harvesting timber are flooding, wetness, and clayey textures. The clay texture of the surface layer limits the use of equipment. Conventional methods of harvesting timber generally can be used, but their use is limited during rainy periods, generally from December to April. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness should be planted.

This soil is moderately well suited to pasture. The main limitations are flooding and wetness. The main pasture plant is common bermudagrass. Excess surface water can be removed by shallow ditches if suitable outlets are available. During flood periods cattle need to be moved to adjacent protected areas or to pastures at higher elevations. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is well suited to woodland and wetland wildlife habitat. Management that encourages the growth of oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many nongame birds. Habitat for wetland wildlife can be improved by constructing shallow ponds for waterfowl and furbearers.

This soil is poorly suited to urban development. Flooding, wetness, and very high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Major flood control structures and extensive local drainage systems are needed to protect this soil from flooding. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons or public sewer systems are needed if this soil is used for homesites.

This Sharkey soil is in capability subclass IVw and woodland group 3w6.

Sh—Sharkey clay, overwash, gently undulating, occasionally flooded. This is a gently undulating, poorly drained soil on low ridges and in swales on the Mississippi River alluvial plain. The ridges are 1 to 3 feet high and 100 to 250 feet wide. The swales are about 75 to 150 feet wide. This soil is subject to occasional flooding for brief to very long periods. Areas range from about 100 to more than 1,500 acres. Slopes are short and choppy and range from 0 to 3 percent.

Typically, the surface layer is dark reddish brown, neutral clay about 6 inches thick. Below this is dark grayish brown, slightly acid clay about 4 inches thick. The subsoil and underlying material to a depth of about 80 inches are gray and dark gray clay.

Included in mapping are a few small areas of the Fausse and Tensas soils. The very poorly drained Fausse soils are in deep swales. The somewhat poorly drained Tensas soils are in slightly higher positions than the Sharkey soils. These included soils make up about 10 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and ponds in low places for long periods after heavy rains. This soil is subject to brief to very long periods of flooding in late winter, spring, and early summer. They may last for longer than a month. Floodwaters typically are 1 to 3 feet deep, but the depth exceeds 10 feet in places. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during the months of December through April. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and woodland. A small acreage is managed for wildlife habitat.

This soil is moderately well suited to cultivated crops. It is limited mainly by flooding; wetness; poor tilth; and short, choppy slopes. The main crops are soybeans and grain sorghum. This soil is sticky when too wet and hard when dry, and it becomes cloddy if farmed when too wet or too dry. Flooding can be controlled by levees, dikes, and pumps. In places irregular slopes hinder tillage operations. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing improve surface drainage, but in places large volumes of soil need to be moved. Tilth and fertility can be improved by returning crop residue to the soil.

This soil is well suited to the production of southern hardwoods. The main management concerns in producing and harvesting timber are flooding, wetness, and clayey textures. The clay texture of the surface layer limits the use of equipment. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to April. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness should be planted.

This soil is moderately well suited to pasture. The main limitations are flooding and wetness. The main pasture plant is common bermudagrass. Excess surface water can be removed by shallow ditches if suitable outlets are available. During flood periods cattle need to be moved to adjacent protected areas or to pastures at higher elevations. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is well suited to woodland and wetland wildlife habitat. Management that encourages the growth of oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many nongame birds. Habitat for wetland wildlife can be improved by constructing shallow ponds for waterfowl and furbearers.

This soil is poorly suited to urban development. Flooding, wetness, and very high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Major flood control structures and extensive local drainage systems are needed to protect this map unit from flooding. Septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Sewage lagoons are needed if this soil is used for homesites. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This Sharkey soil is in capability subclass IVw and woodland group 3w6.

Sk—Sharkey clay, overwash, frequently flooded. This is a level, poorly drained soil in low positions on the natural levees of old distributary channels of the Mississippi River. It is subject to frequent flooding. Areas range from about 20 to more than 1,500 acres. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, neutral clay about 11 inches thick. The upper part of the subsoil is brown, mildly alkaline clay. The lower part is dark gray, moderately alkaline clay. The next layer to a depth of about 64 inches is gray, moderately alkaline clay. In places the surface layer is more than 20 inches thick.

Included in mapping are a few small areas of the Fausse and Tensas soils. The Fausse soils are in slight depressions and remain wet throughout the year. The Tensas soils are in slightly higher positions, are more acid, and have less clay in the subsoil than the Sharkey soils. These included soils make up about 10 percent of the map unit.

This Sharkey soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a very slow rate and ponds in low places for long periods after heavy rains. This soil is subject to brief to more-than-3-months-long periods of flooding. Depth of floodwater is typically 1 to 3 feet, and it exceeds 10 feet in places. During the nonflood period of December through April, a seasonal high water table fluctuates between a depth of 2 feet and the soil surface. The surface layer is very sticky when wet and dries slowly. This soil has a very high shrink-swell potential.

Most of the acreage is in woodland and is used mainly for wildlife habitat.

This soil is poorly suited to woodland. The main concerns in producing and harvesting timber are wetness and frequent flooding. Suitable trees for planting are baldcypress and green ash.

This soil is poorly suited to cultivated crops. It is limited mainly by wetness and frequent flooding.

This soil is poorly suited to pasture. The main pasture plant is common bermudagrass.

This soil is moderately well suited to woodland and wetland wildlife habitat. Management that encourages the growth of oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many nongame birds. Habitat for wetland wildlife can be improved by constructing shallow ponds for waterfowl and furbearers.

This soil is not suited to urban development. Wetness and frequent flooding are severe limitations for this use. Flooding can be controlled only by the use of major flood control structures.

This Sharkey soil is in capability subclass Vw and woodland group 3w6.

So—Solier clay. This is a level, poorly drained soil on low stream terraces. Areas are irregular and range from 30 to more than 700 acres. Flooding from streams is controlled in most places by pump-off systems and manmade levees. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, neutral clay about 6 inches thick. The subsoil is gray, neutral clay in the upper part and yellowish red, neutral clay in the lower part. Below this is a buried surface layer of gray, neutral silt loam about 6 inches thick. The next layer is a buried subsoil of gray, mottled, neutral silty clay loam. The underlying material to a depth of about 84 inches is brown, mildly alkaline silty clay loam. In places the subsoil is yellowish brown, mildly alkaline silty clay loam.

Included in mapping are a few small areas of the Deerford and Moreland soils. The somewhat poorly drained Moreland soils are in slightly lower positions than the Solier soil and are clayey throughout. The somewhat poorly drained Deerford soils are in higher positions and do not have a clay surface layer. These included soils make up about 10 percent of the map unit.

This Solier soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface during the months of December through April. Flooding is rare, but it can occur during periods of unusually prolonged and intense rainfall. The surface layer remains wet and sticky for long periods after heavy rains. This soil has a very high shrink-swell potential in its upper part. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops. This use is limited mainly by wetness, poor tilth, and very slow permeability. Soybeans is the main crop; but rice, cotton, sugarcane, and small grains are also suitable crops. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if farmed when it is too wet or too dry. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate.

This soil is well suited to pasture. The main limitations are wetness and very slow permeability. Suitable pasture plants are common and improved bermudagrass, tall fescue, Pensacola bahiagrass, ryegrass, and white clover. Excess surface water can be removed by shallow ditches. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Nitrogen fertilizer is needed where grasses are grown alone. Lime is generally not needed.

This soil is well suited to woodland; however, only a few areas of native hardwoods remain. Suitable trees to plant are eastern cottonwood and American sycamore.

This soil is poorly suited to urban development. Wetness, flooding, very slow permeability, low strength, and very high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Most areas of this soil are artificially drained by surface ditches, levees, and pumps. Flooding is rare, but it may occur if levees or pumps fail. Buildings and roads can be designed to offset the effects of low strength and shrinking and swelling. Unless drainage is improved, septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods.

This Solier soil is in capability subclass IIIw and woodland group 2w6.

Sr—Solier clay, occasionally flooded. This is a level, poorly drained soil on low stream terraces. It is subject to occasional flooding for long periods. Areas are irregular and range from 10 to 150 acres. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, mildly alkaline clay about 5 inches thick. The next layer is grayish brown, mildly alkaline silty clay about 8 inches thick. Below this is a buried surface layer of light brownish gray, mildly alkaline silt loam. The subsoil to a depth of about 60 inches is grayish brown and light brownish gray, mildly alkaline silty clay loam. In places the subsoil is yellowish brown.

This Solier soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. This soil is subject to long periods of flooding from December through June of some years. Some may exceed 1 month. Floodwaters are typically 1 to 3 feet deep, but the depth may exceed 10 feet in places. A seasonal high water table fluctuates between a depth of 1 1/2 feet and the soil surface during the months of December through April. The surface layer is very sticky when wet and very hard when dry. The shrink-swell potential is very high. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops and pasture. A small acreage is used for woodland.

This unit is moderately well suited to cultivated crops. It is limited mainly by wetness, flooding, and poor tilth. The main crops are soybeans and grain sorghum. This soil is difficult to keep in good tilth. It can be worked only within a narrow range of moisture content and becomes cloddy if farmed when it is too wet or too dry. A drainage system is needed for most cultivated crops and pasture plants. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help maintain soil tilth and content of organic matter.

This soil is moderately well suited to pasture. The main limitations are wetness, very slow permeability, and flooding. The main pasture plant is common bermudagrass. Excess surface water can be removed by shallow ditches. Livestock must be moved to protected areas during flood periods. Proper grazing, weed control, and fertilizer are needed for the highest quality forage.

This unit is well suited to the production of southern hardwoods. The main concern in producing and harvesting timber is wetness that results from flooding and a seasonal high water table. Suitable trees for planting are eastern cottonwood and American sycamore. Because the clayey soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods.

This soil is poorly suited to urban development. The main limitations are flooding and wetness. Flooding can be controlled only by the use of major flood control structures. Excess surface water can be removed by shallow ditches and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly during rainy periods because the soil has a seasonal high water table and very slow permeability.

This Solier soil is in capability subclass IVw and woodland group 2w6.

Ta—Tensas silty clay. This is a level, somewhat poorly drained soil on the natural levees of old distributary channels of the Mississippi River. Most areas are protected from backwater flooding by the West Atchafalaya Basin levees. Areas are long and narrow and range from 30 to 300 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, very strongly acid silty clay about 8 inches thick. The upper part of the subsoil is grayish brown, very strongly acid silty clay, and the lower part to a depth of about 60 inches is grayish brown, strongly acid loam. In places the surface layer is reddish brown clay.

Included in mapping are a few small areas of the Dundee and Sharkey soils. The Dundee soils are in higher positions than the Tensas soil and contain less clay in the surface layer and upper part of the subsoil.

The Sharkey soils are in lower positions than the Tensas soil and are clayey throughout. These included soils make up about 10 percent of the map unit.

This Tensas soil has medium fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table is at a depth of 1 to 3 feet during the months of December through April. Flooding is rare, but it can occur during periods of unusually prolonged and intense rainfall. The surface layer is very sticky when wet, and it dries slowly. The soil swells and shrinks markedly upon wetting and drying. An adequate supply of water is available to plants in most years.

Most of the acreage is used for woodland; however, it is rapidly being cleared for crops. A small acreage is used for pasture.

This soil is moderately suited to cultivated crops. It is limited mainly by wetness, very slow permeability, and poor tilth. The main crop is soybeans; but rice, corn, sugarcane, and grain sorghum are also suitable crops. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing also remove excess water. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting of the surface, and increases the water intake rate.

This soil is well suited to pasture. The main limitations of the soil for this use are wetness and very slow permeability. Suitable pasture plants are common and improved bermudagrass, dallisgrass, tall fescue, johnsongrass, ryegrass, and white clover. Excess surface water can be removed by shallow ditches. Proper grazing, weed control, and fertilizer and lime are needed for highest quality forage.

This soil is well suited to woodland; however, only a few areas remain in native hardwoods. Because the clayey soil is very sticky when wet, most planting and harvesting equipment can be used only during dry periods. Suitable trees for planting are eastern cottonwood and American sycamore.

This soil is poorly suited to urban development. The main limitations of the soil for this use are wetness, flooding, low strength, and very high shrink-swell potential. Excess water can be removed by shallow ditches and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. Streets and roads should be designed to offset the limited ability of this soil to support a load and prevent damage from shrinking and swelling.

This Tensas soil is in capability subclass IIIw and woodland group 2w6.

Te—Tensas silty clay, overwash, occasionally flooded. This is a level, somewhat poorly drained soil on the natural levees of old distributary channels of the Mississippi River. It is subject to occasional flooding for brief to long periods. Areas range from about 20 to 300 acres. Slope is less than 1 percent.

Typically, the surface layer is dark reddish brown, medium acid silty clay about 4 inches thick. The upper part of the subsoil is dark grayish brown and grayish brown, medium acid silty clay. The lower part to a depth of about 60 inches is grayish brown, medium acid and slightly acid silty clay loam, loam, and very fine sandy loam. In places the surface layer is dark grayish brown.

Included in mapping are a few small areas of the Dundee and Sharkey soils. The Dundee soils are in slightly higher positions than the Tensas soil. They are adjacent to drainageways and are loamy throughout. The poorly drained Sharkey soils are in lower positions than the Tensas soil and are clayey throughout. These included soils make up about 10 percent of the map unit.

This Tensas soil has medium fertility. Water and air move through it at a very slow rate. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. A seasonal high water table is at a depth of 1 to 3 feet during the months of December through April. This soil is subject to brief to more-than-a-month-long periods of flooding in winter, spring, and early summer. Floodwaters typically are 1 to 3 feet deep, but the depth exceeds 10 feet in places. This soil has a very high shrink-swell potential. An adequate supply of water is available to plants in most years.

Most of the acreage is used for cultivated crops. A small acreage is used for woodland, wildlife habitat, and pasture.

This soil is moderately well suited to cultivated crops. It is limited mainly by flooding, wetness, and poor tilth. The main crops are soybeans and grain sorghum. This soil is difficult to keep in good tilth and can be worked only within a narrow range of moisture content. Flooding can be controlled by the use of levees, dikes, and pumps. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Land grading and smoothing also improve surface drainage and permit more efficient use of farm equipment. Tilth and fertility can be improved by returning crop residue to the soil.

This soil is well suited to the production of southern hardwoods. The main concerns in producing and harvesting timber are flooding and wetness. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to April. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness should be planted.

Figure 9.—Flooding is a hazard to buildings on this Tensas silty clay, overwash, occasionally flooded.

This soil is moderately well suited to pasture. The main limitations of the soil for this use are flooding and wetness. The main suitable pasture plant is common bermudagrass. Excess surface water can be removed by shallow ditches. During flood periods, cattle need to be moved to adjacent protected areas or to pastures at higher elevations. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum production of grasses and legumes.

This soil is well suited to woodland and wetland wildlife habitat. Management that encourages the growth of oaks and other mast-producing trees improves the habitat for squirrels, white-tailed deer, and many nongame birds. Habitat for wetland wildlife can be improved by construction of shallow ponds for waterfowl and furbearers.

This soil is poorly suited to urban development. Flooding, wetness, low strength, and very high shrink-swell potential are severe limitations of the soil for buildings (fig. 9), local roads and streets, and most sanitary facilities. Major flood control structures and extensive local drainage systems are needed to protect this map unit from flooding. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and very slowly permeable soil during rainy periods. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This Tensas soil is in capability subclass IVw and woodland group 3w6.

Tn—Tensas-Sharkey complex, undulating. These undulating, somewhat poorly drained and poorly drained soils are on the natural levees of old distributary channels of the Mississippi River. This complex is protected from backwater flooding by the West Atchafalaya Basin levees. Areas of this complex range from 100 to 500 acres and contain about 50 percent Tensas soils and 40 percent Sharkey soils. The landscape consists of low, parallel ridges and swales. The ridges are 3 to 5 feet high and about 150 to 300 feet wide. The swales are about 75 to 300 feet wide. Slope ranges from about 1 percent on ridgetops and in swales to about 5 percent on the sides of ridges.

The somewhat poorly drained Tensas soil is on the convex ridges, and the poorly drained Sharkey soil is in the swales between the ridges. The soils of this complex are so intricately intermingled that it was not practical to map them separately.

Typically, the Tensas soil has a surface layer of dark grayish brown, strongly acid silty clay about 5 inches thick. The upper part of the subsoil is dark grayish brown, strongly acid clay. The lower part to a depth of about 60 inches is grayish brown, strongly acid loam and very fine sandy loam. In some places, the surface layer is dark brown or reddish brown clay. In other places, the subsoil contains a thin, reddish brown layer.

This Tensas soil has medium fertility. Water and air move through it at a very slow rate. Water runs off the surface at a medium rate. A seasonal high water table is at a depth of 1 to 3 feet during the months of December through April. Flooding is rare, but it can occur during periods of unusually prolonged and intense rainfall. The surface layer is very sticky when wet, and it dries slowly. The soil swells and shrinks markedly upon wetting and drying. An adequate supply of water is available to plants in most years.

Typically, the Sharkey soil has a surface layer of dark grayish brown, slightly acid clay about 8 inches thick. The subsoil to a depth of about 60 inches is neutral and moderately alkaline, gray and dark gray clay. In some places, the surface layer is dark brown or reddish brown. In other places, the subsoil contains a thin layer of dark brown clay.

This Sharkey soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a very slow rate and ponds in low places for long periods after heavy rains. Flooding is rare, but it can occur during periods of unusually prolonged and intense rainfall. A seasonal high water table fluctuates between a depth of 2 feet and the soil surface during the months of December through April. This soil is subject to flooding by runoff from higher lying soils during prolonged and intense storms. The soil swells and shrinks markedly upon wetting and drying. An adequate supply of water is available to plants in most years.

Included in mapping are a few small areas of the Dundee and Fausse soils. The Dundee soils are on the higher parts of the ridges and are loamy throughout. The very poorly drained Fausse soils are in deep depressions and remain wet most of the year. These included soils make up 10 percent of the map unit.

Most of the acreage of this complex is used for woodland, but it is rapidly being cleared and used for cultivated crops or pasture.

The soils of this map unit are moderately well suited to cultivated crops. They are limited mainly by wetness, very slow permeability, and short, choppy slopes. Runoff is medium, and the hazard of erosion is moderate. The main crops are soybeans and grain sorghum. These soils are sticky when wet and hard when dry, and they become cloddy if farmed when too wet or too dry. A drainage system is needed for most cultivated crops and pasture plants. Land grading and smoothing remove excess water, but generally large volumes of earth need to be moved. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility, reduce runoff and erosion, and help maintain soil tilth and content of organic matter.

The soils of this map unit are moderately well suited to pasture. The main limitations of these soils for this use are wetness, flooding, very slow permeability, and short, choppy slopes. Suitable pasture plants are common and improved bermudagrass, tall fescue, ryegrass, and white clover. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

These soils are well suited to the production of eastern cottonwood, American sycamore, and sweetgum. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to April.

The soils of this unit are poorly suited to urban development. The main limitations of the soils for this use are wetness, flooding, low strength, and very high shrink-swell potential. If areas of this unit are used for building construction, the Tensas soils are better suited than the Sharkey soils. Drainage or other water control systems are needed to remove excess water. Buildings and roads should be designed to offset the limited ability of the soils to support a load and to prevent structural damage from shrinking and swelling. Septic tank absorption fields will not function properly because these soils have very slow permeability and a seasonal high water table.

This Tensas-Sharkey complex is in capability subclass IIIw and woodland group 2w6.

Ts—Tensas-Sharkey complex, overwash, undulating, occasionally flooded. These undulating, somewhat poorly drained and poorly drained soils are on the natural levees of old distributary channels of the Mississippi River. They are subject to occasional flooding. Areas of this complex range from 100 to more than 1,500 acres and contain about 50 percent Tensas soils and about 40 percent Sharkey soils. The landscape consists of low, parallel ridges and swales. The ridges are 3 to 5 feet high and 150 to 300 feet wide. The swales are about 75 to 300 feet wide. Slopes range from about 1 percent on ridgetops and in swales to about 5 percent on the sides of ridges.

The somewhat poorly drained Tensas soil is on the convex ridges, and the poorly drained Sharkey soil is in the swales between the ridges. The soils of this map unit are so intricately intermingled that it was not practical to map them separately.

This Tensas-Sharkey complex is subject to brief to more-than-a-month-long periods of flooding in winter, spring, and early summer. Floodwaters typically are 1 to 3 feet deep, but the depth exceeds 10 feet in places.

Typically, the Tensas soil has a surface layer of dark reddish gray, medium acid silty clay about 4 inches thick. The subsoil is about 47 inches thick. It is grayish brown, strongly acid silty clay in the upper part and grayish brown, slightly acid silty clay loam and loam in the lower part. The underlying material to a depth of about 60 inches is grayish brown, slightly acid loam.

The Tensas soil has medium fertility. Water and air move through it at a very slow rate. Water runs off the surface at a medium rate. During the nonflood period of December through April, a seasonal high water table is at a depth of 1 to 3 feet. The surface layer is very sticky when wet, and it dries slowly. The soil swells and shrinks markedly upon wetting and drying. An adequate supply of water is available to plants in most years.

Typically, the Sharkey soil has a surface layer of dark reddish brown, mildly alkaline clay about 10 inches thick. Below this is a buried surface layer of dark gray, mildly alkaline clay about 10 inches thick. The underlying material to a depth of about 60 inches is gray and dark gray clay. In places the surface layer is dark grayish brown.

The Sharkey soil has high fertility. Water and air move through it at a very slow rate. Water runs off the surface at a very slow rate and stands in low places for long periods after heavy rains. During the nonflood periods of December through April, a seasonal high water table fluctuates between a depth of 2 feet and the soil surface. The soil swells and shrinks markedly upon wetting and drying. An adequate supply of water is available to plants in most years.

Included in mapping are a few small areas of the Dundee and Fausse soils. The Dundee soils are on the higher parts of the ridges and are loamy throughout. The very poorly drained Fausse soils are in deep depressions. These included soils make up about 10 percent of the map unit.

Most of the acreage of this complex is used for woodland and woodland wildlife habitat. A small acreage is also used for cultivated crops and pasture.

This map unit is moderately well suited to the production of southern hardwoods. The main management concerns in producing and harvesting timber are flooding and wetness. Conventional methods of harvesting timber can be used, but their use may be limited during rainy periods, generally from December to April. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness should be planted.

These soils are moderately well suited to cultivated crops. They are limited mainly by flooding, wetness, and short, choppy slopes. The main crops are soybeans and grain sorghum. These soils are sticky when wet and hard when dry, and they become cloddy if farmed when too wet or too dry. Flooding can be controlled by the use of levees, dikes, and pumps.

This unit is moderately well suited to pasture. The main limitations of the soils for this use are flooding and wetness. The main suitable pasture plant is common bermudagrass. Excess surface water can be removed by shallow ditches where suitable outlets are available. During flood periods, cattle need to be moved to adjacent protected areas or to pastures at higher elevations. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This map unit is poorly suited to urban development. The main limitations of the soils for this use are flooding, wetness, and very high shrink-swell potential. If areas of this unit are used for building construction, the Tensas soils are better suited than the Sharkey soils. Major flood control structures and extensive local drainage systems are needed to control flooding. Unless internal drainage is improved, septic tank absorption fields will not function properly in these wet and very slowly permeable soils during rainy periods. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This Tensas-Sharkey complex is in capability subclass IVw and woodland group 3w6.

Vk—Vick silt loam. This is a nearly level, somewhat poorly drained soil on broad flats in the terrace uplands. Areas are irregular and range from 10 to more than 300 acres. Slope is less than 2 percent.

Typically, the surface layer is dark grayish brown and pale brown, strongly acid silt loam about 7 inches thick. The subsoil is yellowish brown, very strongly acid and strongly acid silt loam in the upper part; mottled, light brownish gray and dark yellowish brown, strongly acid silty clay loam and silty clay in the middle part; and yellowish brown and brown, strongly acid silty clay loam and silt loam in the lower part.

Included in mapping are a few small areas of the Kolin and Wrightsville soils. The moderately well drained Kolin soils are on convex ridges and upper side slopes. The poorly drained Wrightsville soils are in slight depressions adjacent to drainageways. These included soils make up about 10 percent of the map unit.

This Vick soil has low fertility. High levels of exchangeable aluminum in the rooting zone are potentially toxic to most crops. Water and air move through this soil at a slow rate. Water runs off the surface at a slow rate. A perched high water table is above the clayey IIB horizon during the months of December through April. This soil has a high shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of most years.

Most of the acreage is used for woodland and pasture. A small acreage is used for cultivated crops and homesites.

This soil is well suited to the production of hardwoods and pine. The main management concerns in producing and harvesting timber are equipment use limitations, seedling mortality, and plant competition. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to April. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is moderately well suited to pasture. Wetness is the main limitation during the spring and winter months, but droughtiness is a limitation during the summer and fall. Suitable pasture plants are common and improved bermudagrass, Pensacola bahiagrass, ryegrass, and white clover. Excess surface water can be removed by shallow ditches. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition. Fertilizer and lime are needed for optimum growth of grasses and legumes.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness in spring and droughtiness in summer and fall. Soybeans is the main crop; but sweet potatoes, Irish potatoes, corn, and vegetables are also suitable crops. This soil is friable and easy to keep in good tilth. It can be worked over a wide range of moisture content. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. Traffic pans develop easily but can be broken up by deep plowing or chiseling. Using minimum tillage and returning all crop residue to the soil or regularly adding other organic matter improves fertility and helps maintain soil tilth and content of organic matter. Most crops respond to fertilizer and liming programs designed to overcome the low fertility and the high levels of aluminum in the soil. Where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of most years.

This soil is poorly suited to urban development. Wetness, slow permeability, low strength, and high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. A perched seasonal high water table is above the clayey subsoil, and drainage should be provided if buildings are constructed. Excess water can be removed by shallow ditches and proper grading. Unless internal drainage is improved, septic tank absorption fields will not function properly in this wet and slowly permeable soil during rainy periods. Buildings and roads can be designed to offset shrinking and swelling and the limited ability of the soil to support a load.

This Vick soil is in capability subclass IIw and woodland group 2w8.

Wr—Wrightsville silt loam. This is a level, poorly drained soil on flats and in slight depressions in the terrace uplands. Areas are irregular and range from 10 to more than 100 acres. Slope is less than 1 percent.

Typically, the surface layer is grayish brown, strongly acid silt loam about 3 inches thick. The subsurface layer is light brownish gray, strongly acid and very strongly acid silt loam about 12 inches thick. The subsoil to a depth of about 68 inches is light brownish gray, mottled, very strongly acid and strongly acid silty clay.

Included in mapping are a few small areas of the Vick soils. The somewhat poorly drained Vick soils are in slightly higher positions than the Wrightsville soil. These included soils make up about 10 percent of the map unit.

This Wrightsville soil has low fertility. High levels of exchangeable aluminum in the rooting zone are potentially toxic to most crops. Water runs off the surface at a slow rate and stands in low places for long periods after heavy rains. Water and air move through this soil at a very slow rate. A seasonal high water table is at a depth of 1/2 inch to 1 1/2 feet during the months of December through April. The subsoil has a high shrink-swell potential. Plants are damaged by lack of water during dry periods in summer and fall of some years.

Most of the acreage is used for woodland. A small acreage is used for pasture and cultivated crops.

This soil is moderately well suited to woodland. Suitable trees to plant are water oak, willow oak, sweetgum, and loblolly pine. The main concern in producing and harvesting timber is wetness. Equipment use is limited unless drainage is provided. Conventional methods of harvesting timber generally can be used, but their use may be limited during rainy periods, generally from December to April. After harvesting, reforestation must be carefully managed to reduce competition from undesirable understory plants. Only trees that can tolerate seasonal wetness should be planted. Proper site preparation and spraying, cutting, or girdling can eliminate unwanted weeds, brush, or trees.

This soil is moderately well suited to pasture. The main limitations are wetness in spring and droughtiness in summer and fall. Suitable pasture plants are common bermudagrass, Pensacola bahiagrass, ryegrass, and white clover. Grazing when the soil is wet puddles the surface layer and damages the plant community. Excess surface water can be removed by shallow ditches. Fertilizer and lime are needed for optimum growth of grasses and legumes. Proper stocking, pasture rotation, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is moderately well suited to cultivated crops. It is limited mainly by wetness in spring and droughtiness in summer. Proper row arrangement, field ditches, and vegetated outlets are needed to remove excess surface water. A tillage pan forms easily if this soil is tilled when wet but can be broken up by chiseling or subsoiling. Returning crop residue to the soil or regularly adding other organic matter improves fertility, reduces crusting, and increases the water intake rate. Most crops respond to fertilizer and liming programs designed to overcome the low fertility and high levels of aluminum. Where water of suitable quality is available, supplemental irrigation can prevent damage to crops during dry periods of most years.

This map unit is poorly suited to urban development. Wetness, very slow permeability, low strength, and high shrink-swell potential are severe limitations for buildings, local roads and streets, and most sanitary facilities. Excess water can be removed by shallow ditches and proper grading. Very slow permeability and the seasonal high water table increase the possibility of failure of septic tank absorption fields. Sewage lagoons or public sewer systems are needed if the soil is used for homesites. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential.

This Wrightsville soil is in capability subclass IIIw and woodland group 3w9.

prime farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is defined as the land best suited to producing food, feed, forage, fiber, and oilseed crops. When treated and managed according to acceptable farming methods, it has the soil quality, growing season, and moisture content needed to produce a sustained high yield of crops. These high yields are produced with minimal expenditure of energy and economic resources, and farming this land results in the least damage to the environment.

Because the supply of high-quality farmland is limited, responsible individuals, as well as government, must encourage and facilitate its use in meeting the Nation's short- and long-range needs for food and fiber.

Prime farmland does not include any soil now being used for urban and built-up land or water areas. It included only those prime farmland soils that are now used for cropland, pasture, or woodland. It must either be used for producing crops or be available for such use.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has a favorable temperature and growing season and acceptable levels of acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated for long periods and generally is not flooded during the growing season. The slope ranges mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland consult the local staff of the Soil Conservation Service.

About 350,000 acres, or nearly 65 percent, of Avoyelles Parish meets the soil requirements for prime farmland. This prime farmland is scattered throughout the parish. About 250,000 acres is in crops. These crops, mainly soybeans, cotton, sweet potatoes, rice, and sugarcane, account for an estimated 75 percent of the parish's total agricultural income each year.

Because Avoyelles Parish is primarily rural with no large population center, it has not lost much of its prime farmland to industrial or urban uses. In recent years, spurred on by the increasing demand for soybeans, large acreages of land only marginally suited to cultivation have been cleared or converted from pasture and placed in cultivation. These marginal lands generally are more erodible and difficult to cultivate or they flood more frequently than lands designated as prime farmland.

Soil map units that make up prime farmland in Avoyelles Parish are listed in this section. This list, however, is a recommendation for a particular land use. The extent of each listed map unit is shown in table 5. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

Soils that have limitations—a seasonal high water table or flooding—may qualify as prime farmland if these limitations are overcome by corrective measures such as drainage or flood control. However, only those soils that have few limitations and need no additional improvements to qualify for prime farmland are included.

The following map units meet the soil requirements for prime farmland except where the use is urban or built-up land: [1]

Bd	Baldwin silty clay loam
Ca	Calhoun silt loam
Cm	Commerce silt loam
Cn	Convent very fine sandy loam
Cu	Convent very fine sandy loam, occasionally flooded
Cv	Coteau silt loam, 1 to 3 percent slopes
Cw	Crowley Variant silt loam
Dd	Dundee silt loam
De	Dundee silty clay loam
Dn	Dundee silty clay loam, occasionally flooded
Ds	Dundee-Sharkey complex, gently undulating

Dv	Dundee Variant clay
Ga	Gallion silt loam
Go	Gallion silty clay loam
Ko	Kolin silt loam, 1 to 5 percent slopes
La	Latanier clay
Lo	Loring silt loam, 0 to 2 percent slopes
Me	Memphis silt loam, 0 to 2 percent slopes
Mh	Memphis silt loam, 2 to 5 percent slopes
Mo	Moreland silt loam
Ms	Moreland clay
Nd	Norwood silt loam
No	Norwood silt loam, occasionally flooded
Nr	Norwood silty clay loam
Nw	Norwood silty clay loam, occasionally flooded
Ra	Roxana very fine sandy loam
Rn	Roxana very fine sandy loam, gently undulating
Ro	Roxana very fine sandy loam, undulating
Ru	Roxana very fine sandy loam, gently undulating, occasionally flooded
Sa	Sharkey clay
So	Solier clay
Ta	Tensas silty clay
Tn	Tensas-Sharkey complex, undulating
Vk	Vick silt loam
Wr	Wrightsville silt loam

[1] Urban or built-up land is any contiguous unit of 10 acres or more that is used for residences, industrial sites, commercial sites, institutional sites, public administrative sites, railroad yards, small parks, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures and spillways, and similar uses.

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the suitabilities and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 272,000 acres of the 347,000 acres of cleared land in Avoyelles Parish was used for crops and pasture in 1980. About 250,000 acres was used for row crops, mainly soybeans, and about 22,000 acres was used for pasture. The cropland acreage is increasing as bottom land hardwood forests are drained and cleared and pastures are converted to cropland.

Differences in crop suitability and management needs result from differences in soil characteristics, such as fertility level, erodibility, organic matter content, availability of water for plants, drainage, and flooding hazard. Cropping systems and soil tillage are also an important part of management. Each farm has a unique soil pattern; therefore, each has unique management problems. Some principles of farm management, however, apply to specific soils and certain crops. This section presents the general principles of management that can be applied widely to the soils of Avoyelles Parish.

Perennial grasses or legumes, or mixtures of these, are grown for pasture and hay. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume. In addition, many farmers seed small grain or ryegrass in the fall for winter and spring forage. Excess grass in summer is harvested as hay for the winter.

Common and improved bermudagrass and Pensacola bahiagrass are the summer perennials most commonly grown. Improved bermudagrass and Pensacola bahiagrass produce good quality forage. Tall fescue, the chief winter perennial grass, grows well only on soils that have a favorable moisture content. All of these grasses respond well to fertilizers, particularly nitrogen.

White clover, crimson clover, vetch, and wild winter peas are the most commonly grown legumes. All of these respond well to lime particularly where grown on acid soils.

Proper grazing is essential for high quality forage, stand survival, and erosion control. Brush and weed control, fertilization, liming, and renovation of the pasture are also important.

Some farmers obtain additional forage by grazing the understory native plants in woodland. Forage volume varies with the woodland site, the condition of the native forage, and the density of the timber stand. Although most woodland is managed mainly for timber, substantial volumes of forage can be obrained from these areas under good management. Stocking rates and grazing periods need to be carefully managed for optimum forage production and to maintain an adequate cover of understory plants to control erosion.

Fertilization and liming. The soils of the parish range from strongly acid to moderately alkaline in the surface layer. Most soils that are used for crops are low in content of organic matter and in available nitrogen. Soils of the botton lands, such as the Norwood, Moreland, Commerce, and Sharkey soils, generally need only nitrogen fertilizer for nonleguminous crops. Some of these soils may become deficient in potassium after many years of continuous row crops. Some bottom-land soils, such as the Dundee, Gallion, and Tensas soils, may need lime and a complete fertilizer for nonleguminous crops. Soils of the uplands generally need lime and a complete fertilizer for crops and pasture plants. The amount of fertilizer needed depends on the kind of crop to be grown, on past cropping history, on the level of yield desired, and on the kind of soil. It should be determined on the basis of soil test results. Information and instructions on collecting and testing soil samples can be obtained from the Cooperative Extension Service.

Organic matter content. Organic matter is an important source of nitrogen for crop growth. It also increases the rate of water intake, reduces surface crusting, and improves tilth. Most soils of the parish that are used for crops, especially those with silt loam or very fine sandy loam surface layers, are low in organic matter content. The level of organic matter can be maintained by growing crops that produce and extensive root system and an abundance of foliage, by leaving plant residue on the surface, by growing perennial grasses and legumes in rotation with other crops, and by adding barnyard manure.

Soil tillage. Soils should be tilled only enough to prepare a seedbed and to control weeds. Excessive tillage destroys soil structure. The clayey soils in the parish become cloddy if cultivated when too wet or too dry. A compacted layer, generally known as a traffic pan or plowpan, sometimes develops just below the plow layer in loamy soils. It can be avoided by not plowing when the soil is wet or by varying the depth of plowing, or it can be broken up by subsoiling or chiseling. The use of tillage implements that stir the surface and leave crop residues in place protects the soil from beating rains. This helps control erosion, reduces runoff, increases infiltration, and reduces surface crusting.

Drainage and flood control. Most of the soils in the parish need surface drainage to make them more suitable for crops. The soils in high positions on natural levees and those in upland areas are drained by a gravity drainage system consisting of row drains and field drains. The clayey soils in low positions on the natural levees are drained by a gravity drainage system consisting of a series of mains, or principal pipelines, and laterals, or smaller drains that branch out from them. The success of the systems depend on the availability of adequate outlets. Another method used to improve drainage is land grading, or precisely leveling the fields to a uniform grade. Land grading improves surface drainage, eliminates cross ditches, and makes longer rows possible.

Large areas of the parish are protected from flooding by levees of the Red River and Atchafalaya River; however, many acres are not protected from backwater flooding or are flooded by runoff from higher areas. Levees and pumps are needed to drain many of the flooded soils that are at low elevations.

Cropping system. A good cropping system includes a legume for nitrogen, a cultivated crop to aid in weed control, a deep-rooted crop to utilize substratum fertility and maintain substratum permeability, and a close-growing crop to help maintain organic matter content. The sequence of crops should keep the soil covered as much of the year as possible.

In Avoyelles Parish, a variety of cropping systems are used, depending on the main crop grown. Where sugarcane is the main crop, three crops of sugarcane are generally obtained from each planting. After the third crop, the field is generally planted to soybeans or fallowed for a year. The content of organic matter in the soil can be maintained under this system by properly utilizing the sugarcane plant residue. In other areas of the parish, soybeans are grown continuously or in rotation with corn, sweet potatoes, rice, or grain sorghum. Grass or legume cover crops are commonly grown during the fall and winter (fig. 10). Double cropping of wheat and soybeans is becoming more common in some places. In other places cabbage, Irish potatoes, or shallots commonly are planted in rotation with soybeans or sweet potatoes.

Control of erosion. Erosion is a major hazard on many soils in Avoyelles Parish. It is an especially serious problem on the soils in the terrace uplands. Many areas of sloping Memphis, Loring, Gore, and McKamie soils have been converted from pasture or woodland to row crops in recent years. These soils are highly susceptible to erosion when left without plant cover for extended periods. If the surface layer of the soil is lost through erosion, most of the available plant nutrients and most of the organic matter are also lost. Soils that have a fragipan, such as the Loring soils, or soils that have a clayey subsoil, such as the Gore and McKamie soils, especially need protection against erosion. It is difficult to produce well-shaped sweet potatoes or high yields of

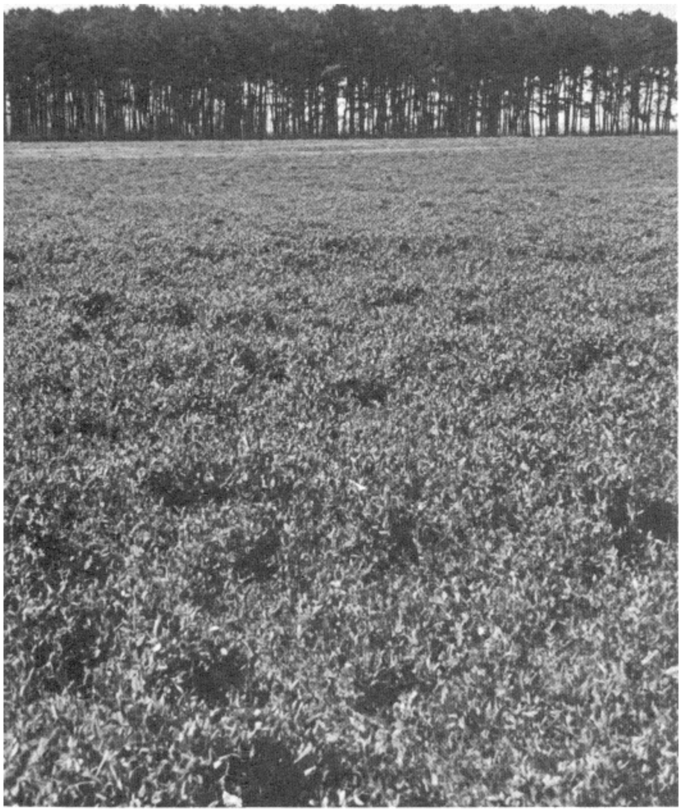


Figure 10.—Wild winter peas provide an excellent cover crop on this Memphis silt loam, 0 to 2 percent slopes.

soybeans in the exposed fragipan or clayey subsoil that remains after the original surface layer has eroded away.

Soil erosion also results in sedimentation of drainage systems and pollution of streams by sediment, nutrients, and pesticides.

Cropping systems that maintain a plant cover on the soil for extended periods reduce soil erosion. Use of legume or grass cover crops reduces erosion, increases the content of organic matter and nitrogen in the soils, and improves tilth. Constructing terraces, diversions, and grassed waterways; using minimum tillage; farming on the contour; and using cropping systems that rotate grass or close-growing crops with row crops help to control erosion on cropland and pasture. Constructing pipe drop structures in drainageways to drop water to different levels can help prevent gullying.

Additional information on erosion control, cropping systems, and drainage practices can be obtained from the local office of the Soil Conservation Service and the Cooperative Extension Service, or from the Louisiana Agricultural Experiment Station.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude thei. use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

Carl V. Thompson, Jr., state staff forester, Soil Conservation Service, helped prepare this section.

Hardwood forests once covered most of Avoyelles Parish. However, clearing the trees for cropland began soon after the early settlers arrived. The loamy soils on bottom lands, best suited to cropland, were cleared first. When soybeans, which grow well on a wide variety of soils, became a commonly grown crop in the parish, the clearing of bottom-land hardwoods accelerated. Today the forested area is rapidly decreasing as many more acres are cleared for cultivation.

About 34 percent of the land in Avoyelles Parish, or 177,000 acres, is woodland. About 90 percent of this acreage is privately owned, and the remaining 10 percent is in state-owned wildlife management areas.

Bottom-land hardwood forests make up about 162,000 acres, or 92 percent of the total woodland in the parish. The largest areas of bottom-land hardwood forests are in general soil map units 6, 8, 9, and 10, described in the section "General soil map for broad land use planning." The most common trees on the bottom lands are overcup oak, Nuttall oak, sugarberry, green ash, sweetgum, water hickory, pecan, and baldcypress. The remaining woodland, about 15,000 acres, on uplands and in drainageways in the northwestern part of the parish, consists of loblolly-shortleaf pine and oak-hickory forest types. These forest types are primarily in general soil map units 13 and 14.

The potential value of wood products in Avoyelles Parish is substantial; however, under present management much of the existing woodland is producing far below its potential. Most of the commercial woodland would benefit if stands were improved by thinning out mature and undesirable trees. Tree planting, protection from grazing and fire, and control of insects and disease are also needed to improve stands. The local offices of the Soil Conservation Service and the Cooperative Extension Service and the Louisiana State Forestry Commission can help determine specific woodland management needs.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil and the letter *c*, clay in the upper part of the soil. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: w and c.

The third element in the symbol, a numeral, indicates the kind of trees for which the soils in the group are best suited and also indicates the severity of the hazard or limitation. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and suitability for needleleaf trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and suitability for broadleaf trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needleleaf and broadleaf trees.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

Avoyelles Parish has many areas of scenic and historic interest. These areas are used for camping, hunting, fishing, sightseeing, picnicking, and boating. Public areas available for recreation include Grassy Lake, Spring Bayou, the Pomme de Terre Wildlife Management Areas, and the Marksville Prehistoric Indian Park and Museum.

The use of recreation areas in the parish has increased greatly in the past several years. Many soils are well suited to the development of recreation facilities. Soils that are best suited are in general soil map units 9 and 14, described under "Broad land use considerations" in the section "General soil map units."

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

wildlife habitat

Billy R. Craft, state staff biologist, Soil Conservation Service, helped prepare this section.

Avoyelles Parish has a large and varied population of fish and wildlife. Habitat types include open agricultural land, upland pine forests, and bottom-land hardwood forests, each supporting populations of game and nongame wildlife.

Areas of cropland and pasture provide food and cover for mourning dove, bobwhite quail, cottontail and swamp rabbits, red fox, coyote, and many types of songbirds and nongame animals. Temporarily flooded fields provide food and resting areas for large concentrations of migrating waterfowl.

The bottom-land hardwood forest in Avoyelles Parish represents some of the best woodland wildlife habitat in the state (fig. 11). This resource continues to be seriously depleted as land is cleared and converted to cropland. White-tailed deer, gray and fox squirrel, swamp rabbit, raccoon, bobcat, coyote, wild turkey, and many types of birds, reptiles, and amphibians inhabit the hardwood forest. Numerous small lakes, bayous, and wetlands provide feeding and resting areas for large populations of herons, ibis, egrets, wood duck, and migrating waterfowl. Endangered or threatened species, such as the bald eagle, alligator, and southern panther, also find food and cover in the bottom-land hardwood areas. The upland pine forests in the northwestern part of the parish provide good habitat for bobwhite quail, cottontail rabbit, and white-tailed deer.

The many ponds, lakes, bayous, and rivers of the parish support large populations of game fish, such as largemouth bass, white bass, white and black crappie, and sunfish. Commercial catfish, buffalo, gaspergou, and paddlefish are caught in large numbers each year. Shallow lakes and wetland areas also provide habitat for crawfish, a very important food for many species of wildlife and man.

Many areas in the parish can be improved for wildlife by increasing the supply of suitable food, water, and cover. Areas that are best suited for improvement are units 9, 10, 13, and 14 described in the section "General soil map units."

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

Figure 11.—This area of bottom-land hardwoods on Baldwin silty clay loam provides excellent habitat for wildlife.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and rice.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bahiagrass, bermudagrass, clover, and vetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, paspalum, wooly croton, and uniola.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, sugarberry, water hickory, sweetgum, persimmon, hawthorn, dogwood, hickory, blackberry, and greenbrier. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are tree huckleberry, redbay, and mayhaw.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness.

Examples of coniferous plants are baldcypress, pine, and cedar.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, and soil moisture. Examples of shrubs are American beautyberry, waxmyrtle, American elder, and sumac.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, wildrice, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the suitability of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (7) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by a very firm dense layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to a high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, the available water capacity in the upper 40 inches, and the content of sodium affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems. and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, soil reaction, and content of sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

water management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as sodium. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone, the amount of sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, toxic substances such as sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(4)* and the system adopted by the American Association of State Highway and Transportation Officials *(3)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of 2 years or less out of 5; and *frequent* that it occurs on an average of more than 2 years out of 5. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months; December-June, for example, means that flooding can occur during the period December through June.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

soil fertility levels

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Soil fertility commonly refers to the available nutrients in the soil together with other chemical conditions that influence growth of plants. It is one of the major factors determining a soil's potential for crop production. The natural fertility level is a reflection of the soil's inherent capacity to supply the nutrients required by plants to provide a favorable chemical environment for roots of plants. Plant nutrient deficiencies as well as excessive quantities of some elements limit yields of crops grown on some soils in Avoyelles Parish.

Evaluation of the soil's fertility requires consideration of the quantities of available plant nutrient elements as indicated by soil test or plant tissue analyses. Special consideration is also given to other soil chemical characteristics that might have a detrimental effect on plant growth. During the survey, samples were collected from each horizon, to a depth of at least 40 inches, of many of the soils mapped. The samples were analyzed to determine soil reaction, the content of organic matter, extractable phosphorus, exchangeable calcium, magnesium, potassium, sodium, aluminum, and hydrogen; and cation exchange capacity. The results of these analyses, given in table 17, are the basis for the discussion in this section.

Soil fertility management and other soil management programs in the area are, with few exceptions, based on chemical and physical alteration of the surface horizon, or plow layer. Characteristics of this horizon may be extremely variable from one place to another depending on past management practices and soil use. However, in this section emphasis is placed on characteristics of horizons below the plow layer. Subsoil horizons are less subject to change, or change very slowly, as a result of alteration of the plow layer. Fertility levels and other chemical characteristics of the surface horizon can be essentially eliminated as limiting factors in plant growth under management systems that include adequate soil testing and fertility maintenance programs. Under these systems, physical characteristics of the plow layer and chemical and physical characteristics of horizons below the plow layer are the soil factors that may limit plant growth, and consequently limit crop yields, that can be obtained through normal crop management practices.

The actual quantity of a nutrient element present as well as the relative quantity of other elements present are important considerations in evaluating a soil's fertility. The soil's cation exchange capacity is a measure of its ability to absorb positively charged ions of calcium, magnesium, potassium, sodium, aluminum, hydrogen, and other elements. Thus, larger quantities of calcium are required to give a high exchangeable calcium saturation if the cation exchange capacity of a soil horizon is high than if it is low. Louisiana Agricultural Experiment Station publications (*7,20*) contain additional information about soil fertility.

Soil cation exchange capacity is almost entirely a result of the amount and kind of clay and organic matter present. The Sharkey soils contain large amounts of clay and have a maximum cation exchange capacity of 41.0 milliequivalents per 100 grams of soil. In contrast, the Convent soils contain relatively small amounts of clay throughout and have a maximum cation exchange capacity of 13.9 milliequivalents per 100 grams of soil. Many of the soils mapped in the parish have subsoil horizons that are more clayey than surface horizons. As a result, they have a greater cation exchange capacity in the subsoil than in surface horizons. The cation exchange capacity in the Memphis soil, for example, is 7.0 milliequivalents per 100 grams of soil in the surface layer and as high as 19.8 milliequivalents per 100 grams of soil in the subsoil.

The distribution pattern of the essential plant nutrient elements in most soils shown in table 17 indicates that weathering of minerals, decomposition of organic matter, and other possible natural sources of nutrient elements do not maintain high levels of these elements in the surface layer and in the upper horizon of the subsoil. In most of these soils, the higher levels of calcium, phosphorus, and potassium in the surface layer can be largely attributed to fertilizer and lime applications. Nutrients accumulated in organic matter and released through its decomposition may also contribute to this distribution pattern. These processes have not maintained higher levels of magnesium in surface layers than in subsoil horizons in most soils.

Excessive quantities of exchangeable sodium, however, are present within the normal depth of rooting of most crops in the Crowley Variant and Deerford soils. In all areas of these soils, some horizons have more than 15 percent of the cation exchange capacity saturated with exchangeable sodium. In almost all years, crops grown on these soils produce lower yields than those grown on associated soils that do not have the high sodium levels. Reduction in crop yields may result from one or more detrimental aspects of the large quantities of sodium (*6*). The sodium reduces soil aggregation, and as a result, the permeability of the soil to air and water is decreased. Consequently, when saturated, these soils dry more slowly than associated soils. This is particularly apparent early in spring after they have become saturated during the wet winter months. Once these soils are dry, recharge of soil moisture from rainfall during the growing season is slower than in associated soils. Plants growing on the soils may suffer drought stress.

The high sodium level may also inhibit or interfere with the plant's uptake of other nutrients such as calcium and magnesium. Quantities of sodium large enough to have a detrimental effect are taken up by some plants. High sodium levels associated with high alkalinity are caustic to some plants. Bicarbonate associated with the large quantities of sodium is possibly toxic. Also, the high alkalinity may result in reduced availability to the plant of many nutrient elements. If large quantities of soluble salts are present in the soil, some plants suffer physiologic drought caused by the osmotic movement of water from the plant to the soil.

Three important characteristics of the soils that have high levels of exchangeable sodium are indicated by the data in table 17. First, the high levels of sodium are almost entirely in subsoil horizons. The Crowley Variant and Deerford soils typically have high sodium levels below a depth of about 10 to 20 inches. Second, all the soils that contain large quantities of sodium in the upper part of the solum also have large quantities in the lower part. This indicates potentially detrimental effects from incorporating subsoil material at the surface as is done, for example, in land smoothing or spreading spoil (soil material taken from excavations for structures such as building foundations, roadways, drainage ditches, and other works). Finally, a neutral or alkaline soil reaction (soil pH 6.6 or greater) is not a reliable indicator of exchangeable sodium.

In some areas, particularly in arid regions, large quantities of exchangeable sodium are typically associated with an alkaline soil reaction. In Avoyelles Parish, soils that have high sodium levels in the upper part of the subsoil have a pH value of 5.8 to 6.6. These soils do have an alkaline reaction, however, at some depth in or below the solum.

High levels of exchangeable sodium are somewhat unusual in soils developed in parent materials 20,000 or more years old in a humid subtropical climate such as characterizes Avoyelles Parish. The source of the sodium in these soils has not been established. Neither have satisfactory economical methods been devised for improvement of the soils for agriculture.

Quantities of exchangeable aluminum that are potentially toxic to some plants are present in some horizons of mineral soils having pH values of less than about 5.5. They can be toxic to many cultivars of crops such as cotton, soybeans, corn, and small grains (*1,2,12,18,19*). A greater than 10 percent saturation of the soil's effective cation exchange capacity with exchangeable aluminum may be toxic to some crops. The effective cation exchange capacity of the soil is the sum of the exchangeable bases. Potentially toxic levels of exchangeable aluminum were not present in surface horizons of any of the soils analyzed. The Coteau, Crowley Variant, Dundee, Gore, Guyton, Kolin, McKamie, Vick, and Wrightsville soils all had exchangeable alluminum saturations of more than 10 percent in either the first or second subsoil horizon beneath the plow layer. In the rest of the soils, exchangeable aluminum was either not present in measurable quantities or the soil was less than 10 percent saturated with exchangeable aluminum in all horizons.

Important relationships exist between saturation with exchangeable aluminum and other properties of mineral soils. First, exchangeable aluminum rather than hydrogen is the dominant form of exchangeable acidity in most horizons. The total exchangeable acidity of any horizon can be obtained by summing exchangeable aluminum and hydrogen. Second, potentially toxic levels of exchangeable aluminum are typically in soil horizons that have a pH of 5.0 or less and in some that have a pH of 5.1 to 5.5. Third, the percent saturation with exchangeable aluminum generally decreases with increasing organic matter content. Thus, surface layers are commonly less saturated with exchangeable aluminum than subsoil horizons having comparable soil pH values. The amounts of exchangeable aluminum typically increase with increasing clay content in horizons having comparable soil reactions, and the percent saturation increases as the soil becomes more acid than about pH 5.5. Consequently, the saturation with exchangeable aluminum is generally highest in the first or second subsoil horizon below the plow layer and decreases at greater depths. The kinds of clay minerals in the soil can also influence the quantities of exchangeable aluminum present.

The complex relationship between exchangeable aluminum and other soil properties indicates the actual measurement of exchangeable aluminum is the only reliable indicator of aluminum levels in acid mineral soils having soil pH of 5.5 or less. Potentially toxic levels of exchangeable aluminum have not been found in soils having higher pH values.

Soil treatments or other cultural methods that reduce or avoid problems associated with high levels of exchangeable aluminum have not been thoroughly studied in Louisiana. Liming soil horizons at above pH 5.5 is probably the most widespread method of reducing the levels (*5,9,15,16,21,22*). There is a wide range of susceptibility to aluminum phytotoxicity among many agronomic crops depending, in some cases, on the particular cultivar grown. Planting crops that are tolerant of high aluminum levels can help avoid phytotoxicity problems.

Manganese is an essential plant nutrient element that may be present in amounts that are toxic to plants in many acid, poorly drained soils. It is somewhat analogous to aluminum in that potentially toxic levels are most common in soil horizons that have a pH of 5.0 to 5.5 or less. Increasing the pH of the soil to ph 6.0 or more reduces manganese solubility to nontoxic levels. Unlike aluminum, manganese can occur either in the oxidized or reduced form in soils. The more soluble reduced form is more prevalent in wet, poorly or somewhat poorly drained soils than in associated soils that are better drained. Also, potentially toxic levels in surface horizons are more common for manganese than for aluminum. Toxicity from high levels of manganese is more common in wet than in dry years.

chemical analyses of selected soils

The results of chemical analyses of several typical pedons in the survey area are given in table 17. The data are for soils sampled at carefully selected sites. Most of the pedons are typical of the series and are described in the section "Soil series and their morphology." Soil samples were analyzed by the Soils Laboratory of the Louisiana Agricultural Experiment Station.

The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (*29*).

Reaction (pH)—1:1 water dilution (8C1a).

Organic carbon—dichromate, ferric sulfate titration (6A1a).

Available phosphorus—(Bray's strong extracting agent).

Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Exchangeable aluminum hydrogen—(6G2) and (6G1d).

Extractable acidity—barium chloride-triethanolamine I (6H1a).

Cation exchange capacity—sum of cations (5A3a). Effective cation exchange capacity (not shown in table) equals exchangeable Ca, Mg, K, Na (5B1a) plus exchangeable aluminum and hydrogen (6G2, 6G1d).

Base saturation—sum of cations, TEA, pH 8.2 (5G3).

Aluminum saturation—percent saturation equals milliequivalents of exchangeable aluminum divided by effective cation exchange capacity multiplied by 100.

Sodium saturation—percent saturation equals milliequivalents of exchangeable sodium divided by the cation exchange capacity (5A3) multiplied by 100.

Calcium/magnesium ratio—milliequivalents of exchangeable calcium divided by milliequivalents of exchangeable magnesium.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*30*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 18, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquents (*Hapl*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, thermic Typic Haplaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*28*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*30*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Baldwin series

The Baldwin series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in intermediate and low positions on natural levees of former channels of the Mississippi River and its distributaries. A seasonal high water table is within 2 feet of the soil surface during the months of December through March of most years. Slope is less than 1 percent.

The soils of the Baldwin series are fine, montmorillonitic, thermic Vertic Ochraqualfs.

The Baldwin soils commonly are near the Dundee and Sharkey soils and are similar to the Tensas soils. The Dundee soils are in slightly higher positions on the natural levees than the Baldwin soils, and they are fine-silty. The Sharkey soils, in lower positions, do not have an argillic horizon. The Tensas soils formed in younger sediments than the Baldwin soils, are more acid in the lower part of the subsoil, and do not have dark coatings on the faces of peds.

Typical pedon of Baldwin silty clay loam, 7 miles southeast of Cottonport, 1.4 miles southwest on Louisiana Highway 1179 from Dupont, 0.5 mile south on field road, 0.5 mile east and south along edge of woods across canal, 150 feet north on woods road, 10 feet east of road, SE1/4SE1/4 sec. 4, T. 2 S., R. 5 E.

A1—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam; weak coarse subangular blocky structure; firm; slightly acid; abrupt wavy boundary.

B21tg—8 to 18 inches; gray (10YR 5/1) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm; shiny ped faces; continuous very dark gray (10YR 3/1) coatings on faces of peds; slightly acid; gradual smooth boundary.

B22tg—18 to 29 inches; gray (10YR 5/1) silty clay; many fine and medium distinct light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure; firm; thin brown (10YR 5/3) ped coatings; many fine dark concretions; few fine hard masses of calcium carbonate; mildly alkaline; clear smooth boundary.

B3tg—29 to 40 inches; gray (10YR 5/1) silty clay loam; common medium distinct light olive brown (2.5Y 5/4) mottles; weak medium prismatic structure; firm; thin discontinuous dark gray (10YR 4/1) coatings on faces of peds; mildly alkaline; clear smooth boundary.

IICg—40 to 60 inches; grayish brown (10YR 5/2) loam; few fine distinct light olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure; friable; neutral.

The thickness of the solum ranges from 40 to 70 inches. When dry, these soils crack to a depth of 20 inches or more.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is 6 to 10 inches thick and ranges from very strongly acid to slightly acid.

The Bt horizon has hue of 10YR, 2.5Y, or 5Y; value of 4 to 6; and chroma of 1 or 2. Texture is clay, silty clay, or silty clay loam. Reaction is medium acid or slightly acid in the upper part and ranges from medium acid to moderately alkaline in the lower part.

The IIC horizon has the same color range as the Bt horizon. Texture is clay, silty clay, silty clay loam, silt loam, loam, or very fine sandy loam. Reaction ranges from neutral to moderately alkaline.

Calhoun series

The Calhoun series consists of poorly drained, slowly permeable soils. These soils formed in loess or similar material in flat areas and depressions on the terrace uplands. A perched seasonal high water table is within 2 feet of the soil surface during the months of December through April of most years. Slope is less than 1 percent.

The soils of the Calhoun series are fine-silty, mixed, thermic Typic Glossaqualfs.

The Calhoun soils commonly are near the Coteau and Loring soils and are similar to the Guyton and Wrightsville soils. The somewhat poorly drained Coteau soils and the moderately well drained Loring soils are on side slopes and convex ridgetops. The Guyton soils are in drainageways and contain more than 10 percent sand in the control section. The Wrightsville soils formed in older sediments on similar landscapes and have a fine textured control section.

Typical pedon of Calhoun silt loam, 1.2 miles south of Mansura, 1.4 miles south on Louisiana Highway 107 from its intersection with Louisiana Highway 114, 50 feet east of the center of Louisiana Highway 107, sec. 60, T. 1 N., R. 4 E.

Ap—0 to 5 inches; grayish brown (10YR 5/2) silt loam; few fine distinct yellowish brown mottles; weak medium granular structure; friable; many fine and very fine roots; neutral; abrupt smooth boundary.

A21g—5 to 12 inches; grayish brown (10YR 5/2) silt loam; common fine distinct yellowish brown mottles; weak medium subangular blocky structure; friable; many fine and very fine roots; neutral; clear smooth boundary.

A22g—12 to 20 inches; grayish brown (10YR 5/2) silt loam; common fine distinct yellowish brown mottles; weak coarse subangular blocky structure; friable; common fine roots; common fine and medium black concretions; medium acid; clear irregular boundary.

B2tg—20 to 35 inches; grayish brown (10YR 5/2) silty clay loam; many fine distinct dark yellowish brown and common fine distinct yellowish brown mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; thin discontinuous clay films on surfaces of peds; tongues of A2 material, 1 to 3 inches wide, extend through the horizon and make up about 20 percent of the horizon; common black stains on surfaces of peds; few fine black concretions and common soft black nodules; strongly acid; clear irregular boundary.

B3g—35 to 55 inches; grayish brown (10YR 5/2) silt loam; many medium distinct dark yellowish brown (10YR 4/4) and common fine distinct yellowish brown mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few patchy clay films on surfaces of peds; few tongues of A2 material in upper part; few fine black concretions; medium acid; clear smooth boundary.

C—55 to 76 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct grayish brown (10YR 5/2) and common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; few thin seams of light brownish gray silt loam; few fine black concretions; medium acid.

The thickness of the solum ranges from 40 to 80 inches. Tongues of the A2 horizon extend deeply into the B horizon.

The A1 or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. It is 3 to 8 inches thick and ranges from very strongly acid to medium acid unless limed.

The A2g horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It ranges from very strongly acid to medium acid unless limed.

The Bg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is silty clay loam or silt loam and ranges from very strongly acid to medium acid.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 to 4. It ranges from very strongly acid to neutral.

Commerce series

The Commerce series consists of somewhat poorly drained, moderately slowly permeable soils. These soils formed in loamy alluvium on the natural levees of the Atchafalaya River. They have a seasonal high water table 1 1/2 to 4 feet below the soil surface during the months of December through April of most years. Slope is less than 1 percent.

The soils of the Commerce series are fine-silty, mixed, monacid, thermic Aeric Fluvaquents.

The Commerce soils commonly are near the Convent and Sharkey soils. The Convent soils are slightly higher in position than the Commerce soils, and they are coarse-silty. The poorly drained Sharkey soils are in lower positions and have a very fine textured control section.

Typical pedon of Commerce silt loam, 5 miles south of Odenburg, 0.8 mile west of Louisiana Highway 105 on shell road, 500 feet south along field drain, 25 feet east of drain, NW1/4NE1/4 sec. 27, T. 2 S., R. 6 E.

Ap1—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; very friable; common fine and very fine roots; mildly alkaline; clear smooth boundary.

Ap2—6 to 12 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint grayish brown and brown mottles; weak medium subangular blocky structure; very friable; common fine and very fine roots; mildly alkaline; clear smooth boundary.

B2—12 to 22 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint brown and grayish brown mottles; weak medium subangular blocky structure; very friable; common fine and very fine roots; very dark grayish brown coatings on surfaces of some peds; few fine soft dark bodies; moderately alkaline; clear smooth boundary.

B3—22 to 32 inches; dark grayish brown (10YR 4/2) silt loam; many fine faint brown and few fine faint grayish brown mottles; weak coarse subangular blocky structure; very friable; few very fine roots; few fine soft dark bodies; moderately alkaline; clear smooth boundary.

C1—32 to 51 inches; grayish brown (10YR 5/2) silt loam; many fine distinct brown and few fine faint dark grayish brown mottles; weak coarse subangular blocky structure; very friable; few very fine roots; few fine soft dark bodies; mildly alkaline; clear smooth boundary.

C2—51 to 68 inches; grayish brown (10YR 5/2) silty clay loam; many fine distinct brown and common fine prominent reddish brown mottles; massive; firm; thin strata of grayish brown (10YR 5/2) silt loam and dark grayish brown (7.5YR 4/2) silty clay in lower part; mildly alkaline.

The thickness of the solum ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is 5 to 12 inches thick and ranges from slightly acid to mildly alkaline.

The B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is silt loam or silty clay loam and ranges from slightly acid to moderately alkaline.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is very fine sandy loam, silt loam, silty clay loam, or silty clay and ranges from neutral to moderately alkaline.

Convent series

The Convent series consists of somewhat poorly drained, moderately permeable soils. These soils formed in loamy alluvium in the highest positions on the natural levees of the Atchafalaya River. They have a seasonal high water table 1 1/2 to 4 feet below the soil surface during the months of December through April of most years. Slope is less than 1 percent.

The soils of the Convent series are coarse-silty, mixed, nonacid, thermic Aeric Fluvaquents.

The Convent soils commonly are near the Commerce and Sharkey soils. The Commerce soils are in slightly lower positions than the Convent soil and are fine-silty. The poorly drained Sharkey soils are in lower positions and have a very fine-textured control section.

Typical pedon of Convent very fine sandy loam, 1.9 miles south of Odenburg, 1.9 miles south of the intersection of Louisiana Highways 105 and 1183, 50 feet west of the centerline of Louisiana Highway 105, 20 feet north of field road, NW1/4SW1/4 sec. 12, T. 2 S., R. 6 E.

Ap1—0 to 5 inches; dark brown (10YR 4/3) very fine sandy loam; common fine faint dark grayish brown and few fine distinct dark yellowish brown mottles; weak fine granular structure; very friable; many fine and very fine roots; medium acid; clear smooth boundary.

Ap2—5 to 10 inches; dark brown (10YR 4/3) very fine sandy loam; common fine faint dark grayish brown and dark yellowish brown mottles; weak medium subangular blocky structure; very friable; many fine and very fine roots; slightly acid; clear smooth boundary.

C1—10 to 20 inches; dark grayish brown (10YR 4/2) very fine sandy loam; common medium distinct yellowish brown (10YR 5/4) and few fine distinct dark yellowish brown mottles; massive; very friable; common fine and very fine roots; distinct thin bedding planes; thin dark brown stratum; mildly alkaline; gradual smooth boundary.

C2—20 to 35 inches; grayish brown (10YR 5/2) very fine sandy loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; massive; very friable; common fine roots; distinct thin bedding planes; moderately alkaline; gradual smooth boundary.

C3—35 to 60 inches; grayish brown (10YR 5/2) very fine sandy loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; very friable; few very fine roots; thin strata of silt loam in lower part; distinct thin bedding planes; moderately alkaline.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is 6 to 14 inches thick and ranges from medium acid to moderately alkaline.

The C horizon has hue of 10YR and value of 4 or 5. Some pedons have strata of 10YR 4/3 or 7.5YR 4/2, 4/4 that make up as much as 40 percent of the 10- to 40-inch control section. The C horizon ranges from neutral to moderately alkaline.

Coteau series

The Coteau series consists of somewhat poorly drained, moderately slowly permeable soils that formed in loess. These soils are on slightly convex ridgetops and side slopes in the terrace uplands. A seasonal high water table is at a depth of 1 1/2 to 3 feet during the months of December through April of most years. Slope ranges from 1 to 3 percent.

The soils of the Coteau series are fine-silty, mixed, thermic Glossaquic Hapludalfs.

The Coteau soils commonly are near the Calhoun, Loring, and Memphis soils and are similar to the Vick soils. The poorly drained Calhoun soils are in slightly lower positions than the Coteau soils. The moderately well drained Loring soils and the well drained Memphis soils are in slightly higher positions on ridgetops and side slopes. The Vick soils are in higher positions and have a clayey IIB horizon.

Typical pedon of Coteau silt loam, 1 to 3 percent slopes, 3.5 miles southwest of Hessmer, south from Hessmer on Louisiana Highway 115 to Highway 3041, southwest 1.4 miles on Highway 3041 to intersection, south and west 0.9 mile to large barn on east side of road, 25 feet east of road in field, SW1/4SE1/4 sec. 33, T. 1 N., R. 3 E.

Ap—0 to 6 inches; dark brown (10Yr 4/3) silt loam; weak medium granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

B21t—6 to 12 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct strong brown mottles; moderate medium subangular blocky structure; friable; common thin patchy clay films on surfaces of peds; common fine soft black bodies; strongly acid; clear smooth boundary.

B22t—12 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; few medium distinct grayish brown (10YR 5/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common thin patchy clay films; common fine black concretions; strongly acid, clear wavy boundary.

B&A'2—15 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; few medium distinct grayish brown (10YR 5/2) and common medium faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable, about 20 to 30 percent of cross section is brittle; common thin patchy clay films on surfaces of peds; interfingers of pale brown (10YR 6/3) silt (A'2) 2 to 4 millimeters thick make up about 15 percent of the horizon; few fine black concretions; strongly acid; clear wavy boundary.

B24t—25 to 37 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct grayish brown (10YR 5/2) and common medium faint brown (10YR 5/3) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, about 20 to 30 percent of cross section is brittle; few thin clay films on surfaces of peds; few fine black concretions; strongly acid; clear wavy boundary.

B3—37 to 60 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few thin patchy clay films on surfaces of peds; strongly acid.

The thickness of the solum ranges from 50 to 72 inches.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is 3 to 9 inches thick and ranges from strongly acid to slightly acid unless limed. Exchangeable aluminum makes up 20 percent or more of the exchangeable cations within some part of the B horizon

The B2t horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. Texture is silt loam or silty clay loam, and reaction ranges from strongly acid to slightly acid.

The A'2 part of the B&A'2 horizon has value of 5 or 6 and chroma of 2 or 3.

The B3 horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 2 to 4; and chroma of 2 to 4. Reaction ranges from strongly acid to neutral.

Crowley Variant

The Crowley Variant consists of somewhat poorly drained, very slowly permeable soils. These soils formed in clayey alluvium in terrace uplands of late Pleistocene age. A seasonal high water table is at a depth of 1/2 to 1 1/2 feet during the months of December through April in most years. Slope ranges from 0 to 1 percent.

The soils of the Crowley Variant are fine, montmorillonitic, thermic Typic Natraqualfs.

The Crowley Variant soils commonly are near the Gore, Kolin, Vick, and Wrightsville soils. None of these soils has a natric horizon. In addition, the moderately well drained Gore soils are on side slopes. The Kolin and Vick soils are in slightly higher positions than the Crowley Variant soils and are fine-silty. The poorly drained Wrightsville soils are in depressional areas and on flats.

Typical pedon of Crowley Variant silt loam, 3 miles north of Centerpoint on local road to Vasher Prairie, 350 feet north of first road intersection, 200 feet east of road, sec. 35, T. 4 N., R. 2 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct brown mottles; moderate fine granular structure; friable; many fine and very fine roots; strongly acid; clear smooth boundary.

A2—7 to 16 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct brown mottles; weak medium subangular blocky structure; friable; common fine and very fine roots; few thin light brownish gray (10YR 6/2) silt coatings in lower part; common dark brown stains on surfaces of peds; strongly acid; abrupt irregular boundary.

IIB21t—16 to 26 inches; red (2.5YR 4/6) clay; many medium prominent grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; very firm; continuous coatings of dark gray (10YR 4/1) on surface of peds; few very fine roots; thick continuous clay films; few irregularly shaped krotovinas of grayish brown (10YR 5/2) silt loam; medium acid; clear wavy boundary.

IIB22t—26 to 35 inches; yellowish red (5YR 4/6) clay; common medium prominent dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; very firm; few very fine roots; thick continuous clay films; few irregularly shaped krotovinas of grayish brown (10YR 5/2) silt loam; medium acid; clear wavy boundary.

IIB23t—35 to 47 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; very firm; common black stains on surfaces of some peds; few fine dark concretions; slightly acid; clear wavy boundary.

IIB3—47 to 81 inches; yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) silty clay loam; moderate medium subangular blocky structure; firm; few thin clay films on surfaces of peds; few fine dark concretions; mildly alkaline; abrupt wavy boundary.

IIC—81 to 96 inches; dark red (2.5YR 3/6) clay; common medium distinct brown (7.5YR 5/4) and few fine distinct grayish brown mottles; massive; very firm; common black stains on surfaces of peds; few fine dark concretions; moderately alkaline.

The thickness of the solum ranges from 60 to 100 inches. Depth to the clayey IIB horizon ranges from 13 to 20 inches. Exchangeable aluminum makes up 20 percent or more of the exchangeable cations within some part of the B horizon.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is 4 to 8 inches thick and very strongly acid or strongly acid unless limed.

The A2 horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is very strongly acid or strongly acid. In some pedons subhorizons of the A2 horizon have a value of 5 and chroma of 3.

The upper part of the IIBt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or hue of 2.5YR, 5YR, or 7.5YR; value of 4 or 5; and chroma of 4 or 6. It is clay or silty clay and ranges from very strongly acid to medium acid. The lower part has hue of 10YR, value of 4 or 5, and chroma of 4 or 6. It is clay, silty clay, or silty clay loam and ranges from strongly acid to neutral.

The IIB3 horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 8. It is typically silty clay loam, but ranges to clay or silty clay. It ranges from slightly acid to mildly alkaline.

The IIC horizon has hue of 2.5YR, 5YR, or 7.5YR. It is clay, silty clay, or silty clay loam and mildly alkaline or moderately alkaline.

Deerford series

The Deerford series consists of somewhat poorly drained, slowly permeable soils. These soils formed in loesslike material on low terraces of late Pleistocene age. They have a seasonal high water table at a depth of 1/2 to 1 1/2 feet during the months of December through April in most years. Slope ranges from 0 to 2 percent.

The soils of the Deerford series are fine-silty, mixed, thermic Albic Glossic Natraqualfs.

The Deerford soils commonly are near the Calhoun and Solier soils. The poorly drained Calhoun soils are in flat areas and depressional areas, are acid throughout, and do not have a natric horizon. The Solier soils are in slightly lower positions than the Deerford soils and have a clayey surface layer.

Typical pedon of Deerford silty loam, 7 miles northeast of North Point, 7 miles east on farm road from Louisiana Highway 115, 2 miles north on field road to levee, 20 feet west to field road, 100 feet south of center of levee, NE1/4NE1/4 sec. 15, T. 4 N., R. 4 E.

Ap—0 to 4 inches; dark brown (10YR 4/3) silt loam; many fine distinct strong brown and few fine faint dark grayish brown mottles; moderate medium granular structure; friable; many fine and very fine roots; many very fine pores; medium acid; abrupt smooth boundary.

A2—4 to 7 inches; pale brown (10YR 6/3) silt loam; common medium distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and very fine roots; medium acid; clear irregular boundary.

B21t—7 to 13 inches; dark grayish brown (10YR 4/2) silty clay loam; many medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; many very fine and common fine roots; distinct continuous clay films on surfaces of peds; common tongues of light brownish gray (10YR 6/2) silt loam 1 to 3 inches wide; strongly acid; clear irregular boundary.

B22t—13 to 24 inches; dark yellowish brown (10YR 4/4) ped interiors, dark grayish brown (10YR 4/2) ped exteriors; silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles and common medium faint grayish brown (10YR 5/2) mottles; weak medium prismatic and moderate medium subangular blocky structure; firm; common fine roots; very few fine tubular pores; continuous thin clay films on surfaces of peds; tongues of A2 material 1 to 3 inches wide extend to a depth of 20 inches; neutral; clear wavy boundary.

B23t—24 to 39 inches; dark yellowish brown (10YR 4/4), grayish brown (10YR 5/2), and yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; common fine tubular pores; discontinuous thin clay films on vertical surfaces of peds; common black stains on surfaces of peds; common soft dark nodules; common crystals of salt; mildly alkaline; clear smooth boundary.

B3—39 to 55 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse prismatic structure; friable; few thin patchy clay films on vertical surfaces of peds; common black stains on surfaces of peds; thin coatings, 7 to 14 millimeters thick, of brown (10YR 5/3) silt loam between prisms; mildly alkaline; clear wavy boundary.

IIB21tb—55 to 78 inches; dark brown (7.5YR 4/4) loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; friable; continuous distinct clay films on surfaces of peds; grayish brown (10YR 5/2) silt loam coatings between prisms; common black stains on surfaces of peds; mildly alkaline; clear smooth boundary.

IIB22tb—78 to 93 inches; dark brown (7.5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; firm; continuous thin clay films on surfaces of peds; common black stains on surfaces of peds; mildly alkaline; clear smooth boundary.

The thickness of the solum above the lithologic discontinuity ranges from 40 to 60 inches. Depth to a subhorizon with more than 15 percent exchangeable sodium ranges from 16 to 32 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is 3 to 8 inches thick and ranges from very strongly acid to slightly acid unless limed.

The A2 horizon has hue of 10YR, value of 5 to 7, and chroma of 2 or 3. It is silt loam or silt and ranges from very strongly acid to slightly acid.

The B2t horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6 on the interior of peds. The exterior of peds dominantly have value of 4 or 5 and chroma of 2. The B2t horizon is silt loam or silty clay loam and ranges from strongly acid to slightly acid in the upper part and from neutral to moderately alkaline in the lower part.

The B3 and IIB2t horizons range from neutral to moderately alkaline. These horizons are silt loam, silty clay loam, sandy clay loam, or loam.

Dundee series

The Dundee series consists of somewhat poorly drained, moderately slowly permeable soils. These soils formed in loamy alluvium on the natural levees of former channels of the Mississippi River and its distributaries. The Dundee soils have a seasonal high water table at a depth of 1 1/2 to 3 1/2 feet during the months of January through April of most years. Slope ranges from 0 to 3 percent.

The soils of the Dundee series are fine-silty, mixed, thermic Aeric Ochraqualfs.

The Dundee soils commonly are near the Baldwin, Sharkey, and Tensas soils. The Baldwin and Tensas soils are in lower positions than the Dundee soils and are more clayey in the upper part of the profile. The Sharkey soils are in the lowest positions on the natural levees and are clayey throughout.

Typical pedon of Dundee silt loam, 0.2 mile northwest of Dupont, 900 feet west of the intersection of Louisiana Highways 107 and 1179, 500 feet north of Louisiana Highway 107 on field road, 20 feet east of center of road, SE1/4NW1/4 sec. 34, T. 1 S., R. 5 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine and very fine roots; slightly acid; abrupt smooth boundary.

B21tg—6 to 12 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and very fine roots; thin discontinuous dark gray clay films on vertical surfaces of peds; medium acid; clear smooth boundary.

B22tg—12 to 25 inches; dark grayish brown (10YR 4/2) silty clay loam; many medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine and very fine roots; distinct continuous dark gray clay films on vertical surfaces of peds; few fine brown and black concretions; medium acid; clear smooth boundary.

B3g—25 to 45 inches; grayish brown (10YR 5/2) clay loam; many fine distinct dark yellowish brown and yellowish brown mottles; weak medium subangular blocky structure; friable; few thin patchy clay films on surfaces of peds; medium acid; clear smooth boundary.

IICg—45 to 63 inches; grayish brown (10YR 5/2) very fine sandy loam; many fine distinct dark yellowish brown and yellowish brown mottles; massive; very friable; neutral.

The thickness of the solum ranges from 30 to 60 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It has value of 3 and chroma of 2 where the horizon is less than 6 inches thick. The A horizon is 4 to 8 inches thick. Texture is silt loam or silty clay loam. Reaction ranges from medium acid to very strongly acid unless limed.

The B2t horizon has hue of 10YR, value of 4 or 5, and chroma of 2. It is loam, silt loam, or silty clay loam and ranges from very strongly acid to medium acid.

The B3 horizon has color similar to the B2t horizon, value of 6, and chroma of 1. It is loam, silt loam, or silty clay loam and is strongly acid or medium acid.

The Dundee soils in map unit Dn are taxadjuncts to the Dundee series because they have a surface layer with hue of 7.5YR, value of 4, and chroma of 2. This is outside the defined range for the series but does not affect the use and management of these soils.

Dundee Variant

The Dundee Variant consists of somewhat poorly drained, slowly permeable soils. These soils formed in clayey and loamy alluvium on the natural levees of former channels of the Mississippi River and its distributaries. A seasonal high water table is at a depth of 1 1/2 to 3 1/2 feet during the months of January through April of most years. Slope ranges from 0 to 1 percent.

The Dundee Variant soils are fine-silty, mixed, thermic Aeric Ochraqualfs.

The Dundee Variant soils commonly are near the Sharkey and Tensas soils. They are similar to the Dundee soils, but the Dundee soils are in higher positions, have a silt loam or silty clay loam surface layer, and are more acid. The Tensas soils, in slightly lower positions, have a clayey argillic horizon. The Sharkey soils are in lower positions on the natural levees and are clayey throughout.

Typical pedon of Dundee Variant clay, about 2.5 miles south of Dupont on Louisiana Highway 107, 0.5 mile east on gravel road from Lacour's Grocery, 500 feet east of West Atchafalaya Basin Floodway levee, NW1/4SW1/4 sec. 11, T. 2 S., R. 5 E.

Ap1—0 to 4 inches; dark reddish brown (5YR 3/3) clay; massive; very firm; common fine and very fine roots; slightly acid; clear smooth boundary.

Ap2—4 to 7 inches; dark reddish gray (5YR 4/2) clay; strong fine angular blocky structure; very firm; common slickensides; slightly acid; abrupt smooth boundary.

IIAb—7 to 14 inches; very dark gray (10YR 3/1) silty clay loam; few fine faint dark yellowish brown mottles; weak medium subangular blocky structure; firm; slightly acid; clear smooth boundary.

IIB21tb—14 to 25 inches; dark grayish brown (10YR 4/2) silty clay loam; many fine distinct yellowish brown and common fine faint brownish gray mottles; moderate medium subangular blocky structure; friable; thin dark gray (10YR 4/1) clay films on surfaces of some peds; slightly acid; clear smooth boundary.

IIB22tb—25 to 30 inches; dark grayish brown (10YR 4/2) loam; many fine distinct dark yellowish brown mottles; weak medium subangular blocky structure; friable; few thin clay films on surfaces of peds; slightly acid; gradual smooth boundary.

IIB31b—30 to 52 inches; grayish brown (10YR 5/2) loam; many fine distinct dark yellowish brown mottles; weak medium subangular blocky structure; friable; few thin patchy clay films on surfaces of peds; slightly acid; abrupt wavy boundary.

IIB32b—52 to 72 inches; gray (10YR 5/1) silty clay; many fine distinct dark yellowish brown mottles; massive; very firm; common fine dark concretions; neutral.

The thickness of the solum ranges from 30 inches to more than 80 inches.

The A horizon has hue of 5YR, value of 3 or 4, and chroma of 2 or 3. It is 4 to 13 inches thick and ranges from slightly acid to mildly alkaline.

The IIA horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is 4 to 8 inches thick and ranges from medium acid to mildly alkaline. Texture is silt loam or silty clay loam.

The IIBt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. It is silt loam, loam, clay loam, or silty clay loam and ranges from medium acid to mildly alkaline.

The IIB3 horizon has colors similar to the IIBt horizon and, in addition, has value of 6 and chroma of 1. It is loam, silt loam, very fine sandy loam, silty clay loam, or silty clay. Reaction ranges from slightly acid to moderately alkaline.

Fausse series

The Fausse series consists of very poorly drained, very slowly permeable soils. These soils formed in clayey alluvium in depressional areas on the alluvial plain. The Fausse soils are ponded or flooded for brief to long periods each year and have a seasonal high water table within 2 feet of the surface throughout the year. Slope is less than 1 percent.

The soils of the Fausse series are very fine, montmorillonitic, nonacid, thermic Typic Fluvaquents.

The Fausse soils commonly are near the Sharkey soils. The poorly drained Sharkey soils are in slightly higher positions than the Fausse soils and crack to a depth of 20 inches or more in most years.

Typical pedon of Fausse clay, 8 miles northeast of Brouillette, east on Louisiana Highway 452 to farm headquarters, east from the headquarters 0.7 mile and south 0.3 mile on field road to woods, 1.2 miles south on woods road to camp, 500 feet south of camp, NE1/4NW1/4 sec. 16, T. 3 N., R. 6 E.

A1—0 to 7 inches; dark brown (7.5YR 4/2) clay; common medium distinct gray (10YR 5/1) mottles and common fine distinct strong brown mottles; weak medium angular blocky structure; plastic; many fine and medium roots; medium acid; clear smooth boundary.

IIA—7 to 13 inches; dark gray (5Y 4/1) clay; common medium distinct dark gray (N 4/0) and strong brown (7.5YR 5/6) mottles; weak medium angular blocky structure; plastic; few fine and coarse roots; slightly acid; clear smooth boundary.

IIB21g—13 to 22 inches; gray (5Y 5/1) clay; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak medium angular blocky structure; plastic; few fine and coarse roots; slightly acid; clear smooth boundary.

IIB22g—22 to 37 inches; gray (5Y 5/1) clay; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak medium angular blocky structure; plastic; neutral; clear smooth boundary.

IIC1g—37 to 49 inches; gray (5Y 5/1) clay; common medium distinct light olive brown (2.5Y 5/4) mottles; massive; plastic; neutral; clear smooth boundary.

IIC2g—49 to 66 inches; gray (5Y 5/1) clay; common medium distinct olive (5Y 5/4) mottles; massive; plastic; neutral.

The thickness of the solum ranges from 25 to 50 inches.

The A1 horizon has hue of 7.5YR or 5YR, value of 3 or 4, and chroma of 3 or 4. Reaction ranges from medium acid to neutral

The IIA horizon has hue of 10YR or 5Y, value of 4, and chroma of 1 or 2, or it is neutral. Reaction ranges from medium acid to neutral.

The IIBg horizon has hue of 10YR or 5Y, value of 4 or 5, and chroma of 1, or it is neutral. Reaction ranges from neutral to moderately alkaline.

The IICg horizon has hue of 5Y, 5GY, or 5BG; value of 4 or 5; and chroma of 1, or it is neutral. Reaction ranges from medium acid to neutral.

The Fausse soils in Avoyelles Parish are taxadjuncts to the Fausse series because they have hue of 7.5YR or 5YR in the surface layer. This is outside of the defined range for the series but does not affect the use and management of these soils.

Gallion series

The Gallion series consists of well drained, moderately permeable soils. These soils formed in loamy alluvium on old natural levees of former channels of the Red River and its distributaries. Slope is less than 1 percent.

The soils of the Gallion series are fine-silty, mixed, thermic Typic Hapludalfs.

The Gallion soils commonly are near the Latanier and Moreland soils and are similar to the Norwood soils. The Latanier and Moreland soils are in lower positions than the Gallion soil, and they have a mollic epipedon and clayey surface horizon. The Norwood soils are on the natural levees of present channels of the Red River and its distributaries and do not have an argillic horizon.

Typical pedon of Gallion silt loam, 1.7 miles northeast of Plaucheville, 1 mile north on Louisiana Highway 1181 from its junction with Louisiana Highway 107, 0.7 mile north on Highway 1182, 275 feet south of Highway 1182 along fence row, 20 feet west of fence, NW1/4SE1/4 sec. 9, T. 1 S., R. 5 E.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine and very fine roots; many fine pores; medium acid; clear smooth boundary.

B21t—8 to 15 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common fine and very fine roots; common very fine tubular pores; thin nearly continuous clay films on surfaces of peds and in pores; medium acid; clear smooth boundary.

B22t—15 to 25 inches; yellowish red (5YR 4/6) silt loam; common medium distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; common very fine tubular pores; thin brown (7.5YR 4/4) clay films on surfaces of peds; few fine black masses; medium acid; clear smooth boundary.

B23t—25 to 37 inches; yellowish red (5YR 5/6) silt loam; common fine distinct reddish yellow mottles; weak medium subangular blocky structure; friable; common very fine tubular pores; thin nearly continuous clay films on surfaces of peds; few fine black masses; medium acid; clear smooth boundary.

B3—37 to 48 inches; yellowish red (5YR 5/6) very fine sandy loam; weak coarse subangular blocky structure; very friable; thin patchy clay films on vertical surfaces of peds; medium acid; gradual smooth boundary.

C—48 to 66 inches; yellowish red (5YR 5/6) very fine sandy loam; massive; very friable; thin strata of silt loam; slightly acid.

The thickness of the solum ranges from 40 to 60 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 or 3. It is 4 to 12 inches thick and ranges from medium acid to neutral. Texture is silt loam or silty clay loam.

The B2t horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam and ranges from medium acid to mildly alkaline.

The B3 horizon has color and texture similar to the B2t horizon. It ranges from medium acid to moderately alkaline.

The C horizon has color similar to the B2t horizon. It is very fine sandy loam, silt loam, or silty clay loam. Reaction ranges from slightly acid to moderately alkaline.

Gore series

The Gore series consists of moderately well drained, very slowly permeable soils. These soils formed in clayey alluvium on convex slopes in the terrace uplands. Slope ranges from 1 to 5 percent.

The soils of the Gore series are fine, mixed, thermic Vertic Paleudalfs.

The Gore soils commonly are near the Guyton, Kolin, McKamie, and Vick soils. The Guyton soils, in drainageways, have gray colors throughout and are fine-silty. The Kolin and Vick soils are in slightly higher positions than the Gore soil and are fine-silty. The well drained McKamie soils are in the steeper areas.

Typical pedon of Gore silt loam, 1 to 5 percent slopes, 4 miles south of Centerpoint, 2 miles east on A. B. Porter road from its intersection with Louisiana Highway 454, 1,050 feet south on pipeline, 10 feet from west edge of pipeline, NE1/4 sec. 36, T. 3 N., R. 2 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine and very fine roots; strongly acid; clear smooth boundary.

A2—4 to 7 inches; brown (10YR 5/3) silt loam; few fine faint yellowish brown mottles; weak medium subangular blocky structure; friable; common fine and medium roots; many very fine pores; strongly acid; clear wavy boundary.

B21t—7 to 15 inches; red (2.5YR 4/6) silty clay; few medium prominent strong brown (7.5YR 5/6) mottles in lower part; moderate medium subangular blocky structure; very firm; few fine medium and large roots; few fine tubular pores; thin patchy clay films on surfaces of peds; strongly acid; clear wavy boundary.

B22t—15 to 29 inches; red (2.5YR 4/6) silty clay; many medium prominent yellowish brown (10YR 5/4) and common fine prominent light brownish gray mottles; moderate medium subangular blocky structure; very firm; few fine medium and large roots; thin patchy clay films on surfaces of peds; strongly acid; clear wavy boundary.

B23t—29 to 36 inches; light brownish gray (10YR 6/2) silty clay; many coarse prominent yellowish red (5YR 4/6) mottles; moderate fine and medium subangular blocky structure; very firm; thin patchy clay films on surfaces of peds; strongly acid; clear wavy boundary.

B31—36 to 47 inches; yellowish red (5YR 4/6) silty clay; common medium distinct red (2.5YR 4/6) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very firm; very few thin patchy clay films; common black stains on surfaces of peds; strongly acid; clear wavy boundary.

B32—47 to 57 inches; reddish brown (5YR 4/4) clay; few fine prominent light brownish gray mottles; weak medium subangular blocky structure; very firm; medium acid; gradual wavy boundary.

C—57 to 66 inches; reddish brown (5YR 4/4) clay; few fine prominent light brownish gray mottles; massive; very firm; neutral.

The thickness of the solum ranges from 40 to 60 inches. Exchangeable aluminum makes up 50 percent or more of the exchangeable cations within some part of the B horizon.

The A1 horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is 2 to 4 inches thick and is strongly acid or medium acid.

The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 2 or 3. It is strongly acid or medium acid.

The upper part of the B2t horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 6. The lower part has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Both parts of the B2t horizon are mottled in shades of red, brown, and gray. Texture is clay or silty clay, and reaction ranges from very strongly acid to medium acid.

The B3 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is clay or silty clay and ranges from strongly acid in the upper part to moderately alkaline in the lower part.

The C horizon has color and texture similar to the B3 horizon. Reaction ranges from slightly acid to moderately alkaline.

Guyton series

The Guyton series consists of poorly drained, slowly permeable soils. These soils formed in loamy alluvium in drainageways that dissect the terrace uplands. They are subject to flooding during periods of prolonged or intense rainfall. The seasonal high water table ranges from the surface to 1 1/2 feet below the surface during the months of December through May. Slope is less than 1 percent.

The soils of the Guyton series are fine-silty, siliceous, thermic Typic Glossaqualfs.

Guyton soils are similar to Calhoun and Wrightsville soils and commonly are near Gore, Kolin, and McKamie soils. Calhoun soils, in flat areas on loess-mantled terraces, have less than 15 percent sand in the control section. Wrightsville soils are in flat areas and in depressional areas and have a fine textured control section. The moderately well drained Gore and Kolin soils and the well drained McKamie soils are on more sloping ridgetops and side slopes.

Typical pedon of Guyton silt loam, frequently flooded, 0.8 mile south of Centerpoint on local road to Wiggins Bayou, 0.7 mile northwest on powerline right-of-way to pipeline, 0.15 mile south on pipeline; 45 feet west of center of pipeline, SW1/4SW1/4 sec. 12, T. 3 N., R. 2 E.

A1—0 to 5 inches; brown (10YR 4/3) silt loam; many fine faint dark yellowish brown mottles; weak medium subangular blocky structure; friable; many fine and very fine roots; many very fine pores; common fine soft black and brown masses; very strongly acid; clear smooth boundary.

A21g—5 to 14 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine and very fine roots; common fine pores; many fine dark brown concretions; very strongly acid; clear wavy boundary.

A22g—14 to 29 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine and medium dark brown concretions; very strongly acid; clear irregular boundary.

B&A—29 to 44 inches; light brownish gray (2.5Y 6/2) silt loam (B2t); 15 percent light gray (10YR 7/2) silt loam (A2); common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; discontinuous thin clay films on surfaces of peds; tongues of A2 material 1 to 3 inches thick extend to a depth of 44 inches; common fine dark brown concretions; very strongly acid; clear wavy boundary.

B22tg—44 to 54 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; thin nearly continuous clay films on surfaces of peds; few thin silt coatings on surfaces of some peds; few fine dark brown and black concretions; very strongly acid; gradual wavy boundary.

B3tg—54 to 63 inches; light brownish gray (10YR 6/2) silty clay loam; few fine distinct yellowish brown mottles; weak medium subangular blocky structure; firm; few thin dark grayish brown clay films on surfaces of peds; few fine brown and black concretions; very strongly acid.

The thickness of the solum ranges from 52 to 80 inches. Tongues of A2 material extend deeply into the Btg horizon. Exchangeable aluminum makes up 50 percent or more of the exchangeable cations within some part of the B horizon.

The A1 horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. It is 2 to 8 inches thick and ranges from very strongly acid to medium acid.

The A2g horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 1 or 2. It is very strongly acid or strongly acid.

The B2tg horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 1 or 2. It is silt loam or silty clay loam and ranges from very strongly acid to medium acid.

The B3tg horizon has color and texture similar to those of the B2tg horizon. It ranges from very strongly acid to moderately alkaline.

Kolin series

The Kolin series consists of moderately well drained, very slowly permeable soils. These soils formed in loamy and clayey alluvium on ridgetops and upper side slopes in the terrace uplands. A seasonal high water table is at a depth of 1 1/2 to 3 feet during the months of December through April of most years. Slope ranges from 1 to 5 percent.

The soils of the Kolin series are fine-silty, siliceous, thermic Glossaquic Paleudalfs.

Kolin soils commonly are near Gore, Guyton, McKamie, and Vick soils. Gore and McKamie soils are on lower side slopes and have fine-textured control sections. The poorly drained Guyton soils are in drainageways and are dominantly gray in color. The somewhat poorly drained Vick soils are on less sloping areas in slightly higher positions and have low-chroma mottles in the upper part of the argillic horizon.

Typical pedon of Kolin silt loam, 1 to 5 percent slopes, 4 miles north of Centerpoint, 1.3 miles southeast on local road from northwest corner of parish, 150 feet north of road, sec. 31, T. 4 N., R. 2 E.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and very fine roots; medium acid; clear smooth boundary.

B21t—4 to 13 inches; strong brown (7.5YR 5/6) silt loam; common fine distinct light yellowish brown mottles; moderate medium subangular blocky structure; friable; common fine and medium roots; common fine tubular pores; discontinuous thin clay films on surfaces of peds; few fine black concretions; strongly acid; clear wavy boundary.

B22t—13 to 22 inches; strong brown (7.5YR 5/6) silty clay loam; common medium prominent red (2.5YR 4/6) and common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; common fine tubular pores; thin patchy clay films on surfaces of peds and in pores; few fine black and brown concretions; strongly acid; clear wavy boundary.

B&A'2—22 to 27 inches; yellowish brown (10YR 5/6) silty clay loam (B2t); light brownish gray (10YR 6/2) silt coatings (2 to 10 millimeters thick) surround peds and make up about 15 percent of the horizon (A2); common fine prominent red mottles; strong fine and medium subangular blocky structure; firm; few fine roots; common fine tubular pores; thin patchy clay films on surfaces of peds and in pores; strongly acid; clear irregular boundary.

IIB24t—27 to 39 inches; strong brown (7.5YR 5/6) silty clay; many medium distinct light brownish gray (10YR 6/2) and common fine prominent red mottles; weak medium subangular blocky structure; very firm; discontinuous thin clay films on surfaces of peds; few fine and medium dark brown concretions; medium acid; clear wavy boundary.

IIB25t—39 to 60 inches; yellowish brown (10YR 5/6) silty clay; many medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very firm; thin patchy clay films on surfaces of peds; medium acid.

The thickness of the solum is more than 60 inches. Depth to the clayey IIB horizon ranges from 20 to 40 inches. Exchangeable aluminum makes up 50 percent or more of the exchangeable cations within some part of the B horizon.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is 3 to 7 inches thick and ranges from strongly acid to slightly acid.

Some pedons have an A2 horizon. Where present, the A2 horizon has value of 5 or 6 and chroma of 2 or 3. It is silt loam and ranges from strongly acid to slightly acid.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 to 8. It is silt loam or silty clay loam and ranges from very strongly acid to medium acid.

The IIB horizon has hue of 10YR, 7.5YR, 5YR, or 2.5YR; value of 4 or 5; and chroma of 6 or 8. It is clay or silty clay and ranges from very strongly acid to slightly acid.

Latanier series

The Latanier series consists of somewhat poorly drained, very slowly permeable soils. These soils formed in clayey and loamy alluvium in intermediate positions on the natural levees of the Red River and its distributaries. A seasonal high water table is at a depth of 1 to 3 feet during the months of December through April of most years. Slope is less than 1 percent.

The soils of the Latanier series are clayey over loamy, mixed, thermic Vertic Hapludolls.

Latanier soils commonly are near Gallion, Norwood, and Roxana soils and are similar to Moreland and Solier soils. The well drained Gallion, Norwood, and Roxana soils are in higher positions than the Latanier soils and they are loamy throughout. Moreland soils, in slightly lower positions, are fine textured throughout. Solier soils are on older terraces at slightly higher elevations and are clayey to a depth of 10 to 24 inches.

Typical pedon of Latanier clay, 4 miles south of Bunkie, 100 feet south of intersection of Louisiana Highway 1176 and U.S. Highway 71, east on farm road across Texas and Pacific Railroad, 0.28 mile south along railroad right-of-way, 100 feet east of railroad track, NW1/4NW1/4 sec. 11, T. 2 S., R. 3 E.

Ap—0 to 5 inches; dark reddish brown (5YR 3/2) clay; moderate medium subangular blocky structure; very firm; many fine and very fine roots; neutral; clear smooth boundary.

B21—5 to 14 inches; dark reddish brown (5YR 3/3) clay; moderate medium subangular blocky structure; very firm; common fine and very fine roots; shiny ped faces; mildly alkaline; clear smooth boundary.

B22—14 to 27 inches; reddish brown (5YR 4/4) clay; strong medium subangular blocky structure; very firm; few fine, medium, and large roots; shiny surfaces on peds; few fine masses of carbonates with hard centers; slight effervescence; abrupt smooth boundary.

IIAb—27 to 35 inches; brown (7.5YR 5/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; slight effervescence; moderately alkaline; clear smooth boundary.

IIB21tb—35 to 53 inches; yellowish red (5YR 4/6) silt loam; moderate medium subangular blocky structure; friable; few very fine roots; thin discontinuous clay films on surfaces of peds; slight effervescence; moderately alkaline; clear smooth boundary.

IIB3b—53 to 60 inches; yellowish red (5YR 5/6) very fine sandy loam; weak medium subangular blocky structure; friable; few thin patchy clay films on surfaces of peds; slight effervescence; moderately alkaline.

The thickness of the solum and depth to contrasting texture range from 20 to 40 inches. Reaction ranges from neutral to moderately alkaline throughout.

The A horizon has hue of 5YR, value of 3, and chroma of 2 or 3. It is 4 to 8 inches thick.

The B horizon has hue of 5YR or 2.5YR, value of 3, and chroma of 3 in the upper part and value of 3 or 4 and chroma of 3 or 4 in the lower part. It is clay or silty clay and is typically calcareous.

The IIA, IIB, and IIC horizons are very fine sandy loam, silt loam, or silty clay loam and are calcareous.

Loring series

The Loring series consists of moderately well drained, moderately slowly permeable soils. These soils formed in loess on ridgetops and side slopes in the terrace uplands. A fragipan is at a depth of 22 to 35 inches. A perched seasonal high water table is on top of the fragipan during the months of December through March. Slope ranges from 0 to 5 percent.

The soils of the Loring series are fine-silty, mixed, thermic Typic Fragiudalfs.

Loring soils commonly are near Calhoun and Coteau soils and are similar to Memphis soils. The poorly drained Calhoun soils and somewhat poorly drained Coteau soils are in slightly lower positions than Loring soils, and they do not have a fragipan. The well drained Memphis soils are in slightly higher positions and do not have a fragipan.

Typical pedon of Loring silt loam, 0 to 2 percent slopes, 0.7 mile east of Mansura, 1.0 mile southeast on Louisiana Highway 1 from its intersection with Louisiana Highway 107, 100 feet east of highway, 5 feet north of fence line, sec. 52, T. 1 N., R. 4 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; many fine and very fine roots; many fine pores; medium acid; clear smooth boundary.

B1—6 to 13 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; many fine and very fine roots; many fine tubular pores; few thin patchy clay films; medium acid; clear wavy boundary.

B2t—13 to 25 inches; brown (7.5YR 4/4) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; common fine and very fine roots; many very fine tubular pores; common thin clay films on surfaces of peds; strongly acid; clear wavy boundary.

Bx1—25 to 40 inches; brown (7.5YR 4/4) silt loam; common medium distinct pale brown (10YR 6/3) mottles; moderate coarse prisms, 4 to 6 inches wide; prisms are dense and brittle and make up 60 to 70 percent of the cross section; seams of pale brown (10YR 6/3) and light brownish gray (10YR 6/2) silt loam between prisms; common fine roots between prisms; many very fine pores; common thin clay films on surfaces of prisms; strongly acid; clear wavy boundary.

Bx2—40 to 49 inches; brown (7.5YR 4/4) silt loam; few fine distinct light brownish gray, yellowish brown, and strong brown mottles; weak very coarse prisms, 6 to 10 inches wide; prisms are dense and brittle and make up 65 to 70 percent of the cross section; seams of pale brown (10YR 6/3) and light brownish gray (10YR 6/2) silt loam between prisms; few fine roots between prisms; many very fine pores; common thin clay films on surfaces of prisms; few dark stains on peds; strongly acid; clear wavy boundary.

Bx3—49 to 61 inches; brown (7.5YR 4/4) silt loam; few fine distinct strong brown mottles; weak very coarse prisms, 6 to 10 inches wide; slightly brittle; thin seams of light brownish gray (10YR 6/2) silt loam between prisms; few thin clay films on surfaces of peds; medium acid.

The thickness of the solum ranges from 45 to 75 inches. Depth to the fragipan ranges from 22 to 35 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is 6 to 9 inches thick and ranges from very strongly acid to medium acid.

The B1 and B2t horizons have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. They are silt loam or silty clay loam and range from very strongly acid to medium acid.

The Bx horizon has color and texture similar to those of the B2t horizon and is mottled in shades of gray, brown, and yellow. It ranges from very strongly acid to medium acid.

McKamie series

The McKamie series consists of well drained, very slowly permeable soils. These soils formed in clayey alluvium on side slopes in the terrace uplands. Slope ranges from 5 to 12 percent.

The soils of the McKamie series are fine, mixed, thermic Vertic Hapludalfs.

McKamie soils are similar to Gore soils and commonly are near Guyton, Kolin, and Vick soils. The moderately well drained Gore soils are on upper side slopes. The poorly drained Guyton soils are in drainageways. The moderately well drained Kolin soils and the somewhat poorly drained Vick soils are in higher positions than McKamie soils and have interfingers of A'2 material within the B2t horizon.

Typical pedon of McKamie silt loam, 5 to 12 percent slopes, 4.3 miles north of Effie on Louisiana Highway 115, 0.8 mile west on first gravel road north of Richey Church, 750 feet west of road, sec. 29, T. 4 N., R. 3 E.

A11—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

A12—3 to 6 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; very friable; many fine and common medium roots; strongly acid; abrupt wavy boundary.

B21t—6 to 18 inches; red (2.5YR 4/6) silty clay; moderate medium subangular blocky structure; very firm; many fine and few medium and large roots; continuous thin clay films on surfaces of most peds; strongly acid; clear wavy boundary.

B22t—18 to 38 inches; yellowish red (5YR 4/6) silty clay; few fine distinct red and common medium distinct brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; very firm; few medium and large roots; discontinuous thin clay films on surfaces of peds; strongly acid; clear wavy boundary.

B3—38 to 49 inches; yellowish red (5YR 4/6) silty clay loam; many fine distinct yellowish brown mottles; weak medium subangular blocky structure; firm; few thin patchy clay films on surfaces of peds; common black stains on surfaces of peds; few pale brown (10YR 6/3) silt coatings on faces of peds; medium acid; gradual wavy boundary.

IIC—49 to 71 inches; stratified reddish brown (5YR 4/4) and yellowish red (5YR 4/6) silt loam and silty clay loam; massive; common fine and medium concretions of calcium carbonate; medium acid.

The thickness of the solum ranges from 36 to 60 inches. Exchangeable aluminum makes up 20 percent or more of the exchangeable cations within some part of the B horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is 3 to 6 inches thick and ranges from strongly acid to slightly acid. Some pedons have a thin A2 horizon.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 6. It is clay or silty clay and ranges from strongly acid to medium acid.

The IIC horizon has thick and thin strata of very fine sandy loam, silt loam, and silty clay loam.

Memphis series

The Memphis series consists of well drained, moderately permeable soils. These soils formed in loess on convex ridgetops and side slopes in the terrace uplands. Slope ranges from 0 to 20 percent.

The soils of the Memphis series are fine-silty, mixed, thermic Typic Hapludalfs.

Memphis soils commonly are near Calhoun, Coteau, and Memphis soils. The poorly drained Calhoun soils and the somewhat poorly drained Coteau soils are on less convex side slopes in slightly lower positions than Memphis soils. The moderately well drained Loring soils are in slightly lower positions and have a fragipan.

Typical pedon of Memphis silt loam, 0 to 2 percent slopes, 1.0 mile northeast of Mansura, 0.2 mile south of the intersection of Louisiana Highways 1 and 107, 0.5 mile east of Louisiana Highway 1 on field road, 0.5 mile north of field road to fence, 700 feet east along fence, 5 feet south of fence, sec. 50, T. 1 N., R. 4 E.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; common fine and very fine roots; medium acid; clear smooth boundary.

B21t—6 to 22 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine and very fine roots; thin discontinuous clay films on surfaces of peds; few dark coatings on surfaces of peds; medium acid; clear smooth boundary.

B22t—22 to 47 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; very friable; few fine roots; few thin clay films on surfaces of peds; few dark coatings on surfaces of peds; few gray silt coatings between peds; strongly acid; gradual smooth boundary.

C—47 to 68 inches; brown (7.5YR 4/4) silt loam; massive; friable; medium acid.

The thickness of the solum ranges from 40 to 78 inches. The soil ranges from very strongly acid to medium acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is 4 to 8 inches thick. Some pedons have a thin A2 horizon.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. It is silt loam or silty clay loam.

The C horizon has color and texture similar to those of the Bt horizon.

Moreland series

The Moreland series consists of somewhat poorly drained, very slowly permeable soils. These soils formed in clayey alluvium in low positions on the Red River alluvial plain. A seasonal high water table is within 1 1/2 feet of the soil surface during the months of December through April of most years. Slope ranges from 0 to 3 percent.

The soils of the Moreland series are fine, mixed, thermic Vertic Hapludolls.

Moreland soils commonly are near Gallion and Norwood soils and are similar to Latanier and Sharkey soils. The well drained Gallion and Norwood soils are in higher positions than Moreland soils and are fine-silty. Latanier soils, in slightly higher positions, are underlain by loamy materials at a depth of 20 to 40 inches. The poorly drained Sharkey soils are in slightly lower positions and are dominantly gray in color.

Typical pedon of Moreland clay, 2 miles north of Bunkie, 0.4 mile south of bridge over Bayou du Lac, 0.45 mile east of Bayou du Lac Road on field road, 25 feet south of field road, SE1/4NW1/4 sec. 9, T. 1 S., R. 3 E.

Ap—0 to 6 inches; dark reddish brown (5YR 3/2) clay; moderate medium granular structure; firm; few fine and very fine roots; neutral; clear smooth boundary.

A1—6 to 13 inches; dark reddish brown (5YR 3/3) clay; moderate fine subangular blocky structure; very firm; few fine roots; shiny surfaces on peds; mildly alkaline; clear smooth boundary.

B21—13 to 24 inches; dark reddish brown (5YR 3/4) clay; moderate fine subangular blocky structure; very firm; few fine roots between peds; distinct slickensides; common fine black stains; strongly effervescent; moderately alkaline; gradual smooth boundary.

B22—24 to 42 inches; dark reddish brown (5YR 3/4) clay; few fine distinct gray mottles; moderate fine subangular blocky structure; very firm; distinct slickensides; common fine black stains; few fine masses of carbonates with hard centers; strong effervescence; mildly alkaline; gradual smooth boundary.

B3—42 to 60 inches; reddish brown (5YR 4/4) clay; few fine distinct gray mottles; weak fine subangular blocky structure; very firm; few distinct slickensides; common fine black stains; few fine masses of carbonates with hard centers; mildly alkaline.

The thickness of the solum is more than 60 inches. Depth to calcareous layers ranges from 10 to 40 inches.

The A horizon has hue of 5YR or 7.5YR, value of 3, and chroma of 2 or 3. It is 10 to 16 inches thick and ranges from slightly acid to mildly alkaline. Texture is silt loam or clay.

The B2 horizon has hue of 5YR or 2.5YR, value of 3 or 4, and chroma of 3 or 4. It is clay or silty clay and ranges from neutral to moderately alkaline. Some pedons have thin silt loam or silty clay loam strata in the B horizon.

The B3 horizon is clay, silty clay, or silty clay loam.

Moreland soils in map units Mo and Mr are taxadjuncts to the Moreland series because they have a surface horizon that has value and chroma of 4. This is outside the defined range for the series but does not affect the use and management of these soils.

Norwood series

The Norwood series consists of well drained, moderately permeable soils. These soils formed in silty alluvium on the natural levees of the Red River and its distributaries. Slope ranges from 0 to 1 percent.

The soils of the Norwood series are fine-silty, mixed, (calcareous), thermic Typic Udifluvents.

Norwood soils are similar to Gallion soils and commonly are near Latanier, Moreland, and Roxana soils. Gallion soils are on older natural levees and have argillic horizons. Roxana soils, in slightly higher positions than Norwood soils, are coarse-silty. Latanier and Moreland soils are in lower positions and have a clayey, mollic epipedon.

Typical pedon of Norwood silt loam, 2 miles northeast of Moreauville, 2 miles east of the intersection of Louisiana Highways 1 and 451, 250 feet south of Louisiana Highway 451 on improved road, 20 feet east of road along fence line, SW1/4NW1/4 sec. 15, T. 1 N., R. 5 E.

Ap—0 to 9 inches; reddish brown (5YR 4/4) silt loam; weak fine granular structure; very friable; many fine and very fine roots; strong effervescence; mildly alkaline; clear smooth boundary.

B2—9 to 16 inches; reddish brown (5YR 4/4) silt loam; weak medium subangular blocky structure; very friable; many fine and very fine roots; many very fine pores; common worm casts; strong effervescence; mildly alkaline; clear wavy boundary.

C1—16 to 31 inches; reddish brown (5YR 5/4) silt loam; massive; very friable; few fine roots; distinct thin bedding planes; thin stratum of very fine sandy loam; strong effervescence; moderately alkaline; clear wavy boundary.

C2—31 to 50 inches; reddish brown (5YR 4/4) silt loam; massive; very friable; distinct bedding planes; strong effervescence; moderately alkaline; clear wavy boundary.

C3—50 to 65 inches; reddish brown (5YR 4/4) silty clay loam; few fine faint dark reddish gray mottles; massive; friable; thin stratum of silt loam; strong effervescence; moderately alkaline; clear wavy boundary.

C4—65 to 80 inches; yellowish red (5YR 4/6) stratified very fine sandy loam and silt loam; massive; very friable; distinct bedding planes; strong effervescence, moderately alkaline.

Bedding planes range from near the soil surface to a depth of 30 inches.

The A horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is 4 to 10 inches thick and is mildly alkaline or moderately alkaline. Texture is silt loam or silty clay loam.

The B horizon has hue of 5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam.

The C horizon has hue of 5YR, value of 4 or 5, and chroma of 4 to 6. It is typically silt loam and silty clay loam but has strata of coarser and finer textured material. Buried soils are common below a depth of about 40 inches.

Roxana series

The Roxana series consists of well drained, moderately permeable soils. These soils formed in silty alluvium. They are in high positions on recent natural levees of the Red River. Slope ranges from 0 to 5 percent.

The soils of the Roxana series are coarse-silty, mixed, nonacid, thermic Typic Udifluvents.

Roxana soils commonly are near Latanier, Moreland, and Norwood soils. The somewhat poorly drained Latanier and Moreland soils, in lower positions than Roxana soils, have a clayey mollic epipedon. Norwood soils are in slightly lower positions and are fine-silty.

Typical pedon of Roxana very fine sandy loam, gently undulating, 5 miles east of Effie, 5.5 miles east on Louisiana Highway 1196 from its intersection with Louisiana Highway 107, north 0.5 mile on gravel road, east 0.3 mile on gravel road, 70 feet north of road, NW1/4NW1/4 sec. 21, T. 3 N., R. 4 E.

Ap—0 to 5 inches; reddish brown (5YR 4/4) very fine sandy loam; weak fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

C1—5 to 14 inches; yellowish red (5YR 5/6) very fine sandy loam; massive; few faint bedding planes; very friable; common fine roots; neutral; clear smooth boundary.

C2—14 to 35 inches; yellowish red (5YR 5/6) loamy very fine sand; massive; very friable; distinct thin bedding planes; moderately alkaline; clear smooth boundary.

C3—35 to 40 inches; yellowish red (5YR 4/6) very fine sandy loam; massive; very friable; distinct thin bedding planes; strong effervescence; moderately alkaline; clear smooth boundary.

C4—40 to 62 inches; stratified reddish brown (5YR 4/4) silt loam and very fine sandy loam; massive; distinct thin bedding planes; strong effervescence; moderately alkaline.

Bedding planes are evident in the 10- to 40-inch control section.

The A horizon has hue of 5YR, value of 4, and chroma of 4 to 6. It is 3 to 6 inches thick and ranges from slightly acid to moderately alkaline.

The C horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loamy very fine sand, very fine sandy loam, or silt loam. Some pedons have thin strata of coarser or finer textured material. The C horizon ranges from neutral to moderately alkaline.

Some pedons have a buried A horizon below a depth of 40 inches.

Sharkey series

The Sharkey series consists of poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low positions on natural levees and in depressional areas on the Mississippi River alluvial plain. A seasonal high water table is within 2 feet of the soil surface during the months of December through April of most years. Slope ranges from 0 to 3 percent.

The soils of the Sharkey series are very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

Sharkey soils are similar to Baldwin and Moreland soils and commonly are near Commerce, Dundee, Fausse, and Tensas soils. Baldwin soils are in slightly higher positions than Sharkey soils and have an argillic horizon. Moreland soils, in higher positions, have a mollic epipedon and are reddish brown in color. Commerce and Dundee soils are in higher positions on the natural levees and are fine-silty. Fausse soils are in lower positions and do not crack to a depth of 20 inches in most years. Tensas soils are in slightly higher positions and have a loamy IIB horizon at a depth of 20 to 36 inches.

Typical pedon of Sharkey clay, overwash, occasionally flooded, 3 miles southeast of Brouillette, 2.8 miles east of Brouillette on Louisiana Highway 452, 1.5 miles south on farm road, 150 feet west on field road, 30 feet north of road, SE1/4SE1/4 sec. 29, T. 3 N., R. 5 E.

Ap—0 to 12 inches; dark reddish brown (5YR 3/4) clay; moderate medium subangular blocky structure; very firm; common fine and very fine roots; common fine charcoal fragments in upper part; neutral; clear wavy boundary.

IIA—12 to 23 inches; dark grayish brown (10YR 4/2) clay; common medium distinct strong brown (7.5YR 5/6) and few medium faint gray (10YR 5/1) mottles;

moderate medium subangular blocky structure; very firm; few fine roots; thin dark reddish gray (5YR 4/2) coatings on vertical surfaces of peds; neutral; clear smooth boundary.

IIB2g—23 to 46 inches; olive gray (5Y 5/2) clay; many fine prominent yellowish brown (10YR 5/8) and few fine prominent strong brown mottles; moderate medium subangular blocky structure; very firm; few fine roots; neutral; clear smooth boundary.

IIB3g—46 to 59 inches; gray (5Y 5/1) clay; common fine prominent yellowish brown mottles; massive; very firm; few fine masses of salt crystals; slightly acid; clear smooth boundary.

IICg—59 to 66 inches; gray (5Y 5/1) silty clay loam; common fine prominent strong brown and few fine prominent yellowish brown mottles; massive; firm; neutral.

The thickness of the solum ranges from 36 to 60 inches. Cracks 1 to 3 centimeters wide form to a depth of 20 inches or more during dry periods of most years.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is 4 to 15 inches thick and ranges from strongly acid to moderately alkaline.

The IIBg horizon has hue of 10YR or 5Y, value of 4 to 6, and chroma of 1 or 2. It ranges from medium acid to moderately alkaline.

The IICg horizon is similar in color to the IIBg horizon. It is typically clay or silty clay, but in some pedons it is coarser textured below a depth of 40 inches. The IICg horizon ranges from neutral to moderately alkaline.

Sharkey soils in map unit Sa are taxadjuncts to the Sharkey series because they have a dark brown clay layer about 8 inches thick between depths of 16 and 24 inches. This difference does not affect use and management of these soils.

Solier series

The Solier series consists of poorly drained, very slowly permeable soils that formed in silty alluvium or loess underlying clayey alluvium. These soils are on low stream terraces. They have a seasonal high water table within 1 1/2 feet of the soil surface during the months of December through April of most years. Slope ranges from 0 to 1 percent.

The soils of the Solier series are clayey over fine-silty, mixed, nonacid, thermic Aeric Haplaquepts.

Solier soils commonly are near Calhoun, Deerford, and Moreland soils, and are similar to Latanier soils. Calhoun soils are in slightly higher positions than the Solier soils and are loamy throughout. Deerford soils, in slightly higher positions, are loamy throughout and have a natric horizon. Moreland soils, in slightly lower positions, have a mollic epipedon and are clayey throughout. Latanier soils are on recent natural levees and are clayey from the surface to a depth of 20 to 40 inches.

Typical pedon of Solier clay, 6 miles northeast of Effie, 60 feet south and 60 feet west of the northeast corner of sec. 32, T. 4 N., R. 4 E.

Ap—0 to 6 inches; dark reddish brown (5YR 3/3) clay; moderate medium subangular blocky structure; very firm; common fine and very fine roots; common slickensides; neutral; clear smooth boundary.

B21—6 to 14 inches; gray (10YR 5/1) clay; common medium distinct yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; very firm; common fine and very fine roots; distinct nearly continuous reddish brown (5YR 4/4) clay films on vertical surface of peds; neutral; clear wavy boundary.

B22—14 to 19 inches; yellowish red (5YR 4/6) clay; common medium distinct gray (10YR 5/1) mottles; moderate medium subangular blocky structure; very firm; few fine roots; neutral; abrupt wavy boundary.

IIA2bg—19 to 25 inches; gray (10YR 6/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; common very fine tubular pores; common medium and large old root channels filled with clay; neutral; abrupt irregular boundary.

IIB23tbg—25 to 42 inches; gray (10YR 6/1) silty clay loam; many medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; continuous thin clay films on surfaces of peds; few old root channels filled with clay; few black and brown concretions; tongues of light brownish gray (10YR 6/2) silt loam (A material) 1 to 3 inches wide extend to a depth of 40 inches; neutral; clear wavy boundary.

IIB24tbg—42 to 60 inches; gray (10YR 6/1) silty clay loam; many fine and medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; discontinuous thin clay films on surfaces of peds; common fine black and brown concretions; neutral; clear smooth boundary.

IIB3bg—60 to 77 inches; mottled gray (10YR 6/1), yellowish brown (10YR 5/6), and pale brown (10YR 6/3) silty clay loam; weak medium subangular blocky structure; firm; few thin patchy clay films on surfaces of peds; few fine black and brown concretions; common black stains; mildly alkaline; clear smooth boundary.

IIC—77 to 84 inches; brown (10YR 5/3) silty clay loam; many medium distinct strong brown (7.5YR 5/6) and common fine faint gray mottles; weak coarse subangular blocky structure; friable; few black stains; mildly alkaline.

The thickness of the solum ranges from 50 to 80 inches or more. Depth to the loamy IIAbg horizon ranges from 12 to 24 inches.

The Ap horizon has hue of 5YR, value of 3, and chroma of 3 or 4. It is 4 to 8 inches thick and ranges from slightly acid to mildly alkaline. Texture is clay or silty clay.

The B2 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2 in the upper part and hue of 5YR, value of 4 or 5, and chroma of 4 or 6 in the lower part. It is clay or silty clay and ranges from slightly acid to mildly alkaline.

The IIAbg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is 5 to 12 inches thick and ranges from neutral to moderately alkaline.

The IIBtbg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It is silty clay loam or silt loam and ranges from neutral to moderately alkaline.

The IIB3bg and IIC horizons are mottled with shades of brown and gray. Texture is silt loam, silty clay loam, or silty clay. Reaction ranges from neutral to moderately alkaline.

Tensas series

The Tensas series consists of somewhat poorly drained, very slowly permeable soils that formed in stratified clayey and loamy alluvium. These soils are on natural levees of the Mississippi River and its distributaries. A seasonal high water table is at a depth of 1 to 3 feet during the months of December through April of most years. Slope ranges from 0 to 5 percent.

The soils of the Tensas series are fine, montmorillonitic, thermic Vertic Ochraqualfs.

Tensas soils are similar to Baldwin soils and commonly are near Dundee and Sharkey soils. The poorly drained Baldwin soils are similar in position to Tensas soils, but they are less acid in the lower part of the subsoil and have dark coatings on the faces of peds. Dundee soils, in higher positions, are loamy throughout. The poorly drained Sharkey soils are in lower positions and are clayey throughout.

Typical pedon of Tensas silty clay, in an area of Tensas-Sharkey complex, overwash, undulating, occasionally flooded, 3 miles northeast of Bordelonville, north on bridge crossing Bayou des Glaises, 0.1 mile south of Bordelonville school, 0.2 mile east to unimproved road, 4 miles north and east along unimproved road to a camp, 125 feet north of road, 40 feet west of camp, NW1/4SW1/4 sec. 16, T. 2 N., R. 6 E.

A1—0 to 4 inches; dark reddish gray (5YR 4/2) silty clay; weak medium subangular blocky structure; very firm; common fine and very fine roots; medium acid; abrupt smooth boundary.

IIB21t—4 to 14 inches; grayish brown (10YR 5/2) silty clay; common medium distinct strong brown (7.5YR 5/8) mottles; strong medium subangular blocky structure; very firm; common fine and few medium roots; distinct reddish gray (5YR 5/2) clay films on vertical surfaces of peds; strongly acid; clear smooth boundary.

IIB22t—14 to 28 inches; grayish brown (10YR 5/2) silty clay; many medium distinct dark yellowish brown (10YR 4/4) and common fine distinct yellowish brown mottles; strong medium subangular blocky structure; very firm; common medium and large roots; distinct reddish gray (5YR 5/2) clay films on vertical surfaces of peds; strongly acid; abrupt smooth boundary.

IIIB31—28 to 36 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few medium and large roots; thin patchy clay films on surfaces of peds; slightly acid; clear smooth boundary.

IIIB32—36 to 51 inches; grayish brown (10YR 5/2) loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few thin patchy clay films on surfaces of peds; slightly acid; gradual smooth boundary.

IIIC—51 to 60 inches; grayish brown (10YR 5/2) loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; slightly acid.

The thickness of the solum ranges from 30 to 50 inches. Depth to the loamy IIIB horizon is 20 to 36 inches. In dry seasons, the soil cracks to a depth of 20 inches or more.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is 3 to 8 inches thick and ranges from very strongly acid to slightly acid.

The IIBt horizon has hue of 10YR or 2.5Y and value of 4 or 5. It is clay or silty clay and ranges from very strongly acid to medium acid.

The IIIB horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is loam, silt loam, or silty clay loam and ranges from strongly acid to slightly acid.

Tensas soils in map units Te and Ts are taxadjuncts to the Tensas series because they have a thin, dark reddish brown or dark reddish gray surface layer. This is outside of the defined range for the series but does not affect the use and management of these soils.

Vick series

The Vick series consists of somewhat poorly drained, slowly permeable soils. These soils formed in loamy and clayey alluvium underlying a thin mantle of loess. They are on terrace uplands. A seasonal high water table is at a depth of 6 inches to 2 feet during the months of December through April of most years. Slope ranges from 0 to 2 percent.

The soils of the Vick series are fine-silty, siliceous, thermic Glossaquic Hapludalfs.

Vick soils are similar to Coteau soils and commonly are near Gore, Kolin, and Wrightsville soils. Coteau soils are on loess-mantled stream terraces but do not have the clayey IIB horizon of the Vick soils. The moderately well drained Gore soils are on side slopes and have fine-textured control sections. The moderately well drained Kolin soils are in more convex areas. The poorly drained Wrightsville soils are on flats and in depressional areas.

Typical pedon of Vick silt loam, 4 miles south of Centerpoint, from Ruby Post Office in Rapides Parish, 1.4 miles east on gravel road, 150 feet south on woods trail, 10 feet west of trail, NW1/4 sec. 36, T. 3 N., R. 2 E.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine and medium roots; many fine black concretions; strongly acid; clear smooth boundary.

A2—3 to 7 inches; pale brown (10YR 6/3) silt loam; common medium distinct dark grayish brown (10YR 4/2) mottles; weak coarse subangular blocky structure; friable; many fine and medium roots; many very fine tubular pores; common fine black concretions; strongly acid; clear wavy boundary.

B1—7 to 14 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; many fine and medium roots; many very fine tubular pores; common fine black concretions; very strongly acid; clear wavy boundary.

B21t—14 to 21 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and faint yellowish brown (10YR 5/6) mottles; common fine prominent red mottles; moderate medium subangular blocky structure; friable; few fine and common medium roots; common fine tubular pores; few thin clay films on surfaces of peds and in pores; few thin silt coatings on surfaces of some peds in lower part; common fine black concretions; strongly acid; clear wavy boundary.

B&A—21 to 25 inches; light brownish gray (10YR 6/2) silty clay loam (B2t); common medium distinct yellowish brown (10YR 5/6) and few medium prominent yellowish red (5YR 5/6) mottles; moderate fine subangular blocky structure; firm; few fine and common medium roots; distinct clay films on surfaces of peds; gray (10YR 6/1) silt coatings 1 to 5 millimeters thick on surfaces of peds make up 15 percent of horizon (A2); strongly acid; abrupt wavy boundary.

IIB22t—25 to 36 inches; mottled light brownish gray (10YR 6/2) and dark yellowish brown (10YR 4/4) silty clay; moderate coarse subangular blocky structure; very firm; few medium roots; few thin clay films on surfaces of peds; few thin gray (10YR 6/1) silt coatings on surfaces of peds in upper part; strongly acid; clear wavy boundary.

IIB23t—36 to 45 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine tubular pores; distinct clay films on surfaces of some peds and in pores; few thin silt coatings on surfaces of some peds; strongly acid; clear wavy boundary.

IIIB3t—45 to 63 inches; brown (10YR 5/3) silt loam; common medium distinct yellowish brown (10YR 5/6) and faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; many fine tubular pores; few thin patchy clay films on surfaces of peds; few black web-shaped stains on surfaces of peds; strongly acid.

The thickness of the solum ranges from 50 to about 80 inches. Depth to the clayey IIB horizon ranges from 20 to 35 inches. The A and B horizons, above the IIB horizon, have 3 to 10 percent total sand content. Exchangeable aluminum makes up 50 percent or more of the exchangeable cations within some part of the B horizon.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is 3 to 6 inches thick and ranges from very strongly acid to medium acid. The A2 horizon, where present, has hue of 10YR, value of 5 or 6, and chroma of 3 or 4.

The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It ranges from very strongly acid to medium acid. Some pedons do not have an A2 horizon.

The B1 and B2t horizons have hue of 10YR, value of 5, and chroma of 4 to 6. Reaction ranges from very strongly acid to medium acid. Typically, the texture is silt loam, but silty clay loam is within the range.

The B part of the B&A horizon has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. It is silt loam or silty clay loam and ranges from very strongly acid to medium acid.

The IIBt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2, 4, or 6. It is clay or silty clay in the upper part and ranges to silty clay loam in the lower part. Reaction is very strongly acid to medium acid.

The IIIB3t horizon has hue of 10YR, value of 5, and chroma of 4 to 6. It is loam, silt loam, or silty clay loam, and ranges from strongly acid to neutral.

Wrightsville series

The Wrightsville series consists of poorly drained, very slowly permeable soils that formed in clayey sediments. These soils are in flat areas and depressional areas in the terrace uplands. A seasonal high water table is at a depth of 6 inches to 1 1/2 feet during the months of December through April of most years. Slope is less than 1 percent.

The soils of the Wrightsville series are fine, mixed, thermic Typic Glossaqualfs.

Wrightsville soils are similar to Calhoun and Guyton soils and commonly are near Kolin and Vick soils. Calhoun soils are on loess-mantled terraces and are fine-silty. Guyton soils are in drainageways and are fine-silty. The moderately well drained Kolin soils and the somewhat poorly drained Vick soils are on convex side slopes.

Typical pedon of Wrightsville silt loam, 6 miles northwest of Effie, 1.5 miles north of first road intersection past the Centerpoint Pentecostal Church, 500 feet south of road on pipeline, 25 feet west of pipeline, SW1/4NW1/4 sec. 20, T. 4 N., R. 3 E.

A1—0 to 3 inches; grayish brown (10YR 5/2) silt loam; common fine faint dark yellowish brown mottles; weak fine granular structure; friable; many fine and very fine roots; many fine pores; few soft dark nodules; strongly acid; clear smooth boundary.

A21g—3 to 8 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown mottles; weak coarse subangular blocky structure; friable; common fine and very fine roots; common fine tubular pores; common fine black and brown concretions; strongly acid; clear wavy boundary.

A22g—8 to 15 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; friable; common fine and medium roots; few thin horizontal streaks of white (5Y 8/1) silt; common fine brown and black concretions; very strongly acid; abrupt irregular boundary.

B&A—15 to 35 inches; light brownish gray (10YR 6/2) silty clay (B2t); 20 percent light gray (10YR 7/1) silt loam (A2); common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; very firm; few medium and large roots; continuous thin dark grayish brown (10YR 4/2) clay films on surfaces of peds; tongues of A2 material 1 to 4 inches wide extend through the horizon; common fine black and brown concretions; very strongly acid; gradual wavy boundary.

B2tg—35 to 50 inches; light brownish gray (2.5Y 6/2) silty clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots; continuous thin clay films on surfaces of peds; tongues of A2 material extend to a depth of 42 inches; common fine black concretions; very strongly acid; gradual wavy boundary.

B3g—50 to 68 inches; light brownish gray (2.5Y 6/2) silty clay; common medium and coarse distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very firm; few thin clay films on vertical faces of peds; strongly acid.

The thickness of the solum ranges from 40 to 70 inches. Tongues of A2 material extend deeply into the B2t horizon. Exchangeable aluminum makes up 50 percent or more of the exchangeable cations within some part of the B horizon.

The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2. It is less than 5 inches thick and ranges from very strongly acid to medium acid.

The A2g horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is very strongly acid or strongly acid.

The B2tg horizon is similar in color to the A2 horizon. It is silty clay loam, silty clay, or clay and is very strongly acid or strongly acid.

formation of the soils

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In this section, the processes and factors of soil formation are discussed and related to the soils in the survey area.

processes of soil formation

The processes of soil formation influence the kind and degree of development of soil horizons. The rate and relative effectiveness of different processes are determined by the factors of soil formation: climate, living organisms, relief, parent material, and time.

Important soil-forming processes include those that result in (1) additions of organic, mineral, and gaseous materials to the soil; (2) losses of these same materials from the soil; (3) translocation of materials from one point to another within the soil; and (4) physical and chemical transformation of mineral and organic materials within the soil (*25*). Typically, many processes take place simultaneously. Examples in the survey area include accumulation of organic matter, development of soil structure, formation and translation of clay, and leaching of bases from some soil horizons. The contribution of a particular process may change over a period of time. For example, installation of drainage and water control systems can change the length of time the soils are flooded or saturated with water. Some important processes that have contributed to the formation of soils in Avoyelles Parish are discussed in the following paragraphs.

Organic matter has accumulated, has partly decomposed, and has been incorporated into all the soils. Organic matter production is greatest in and above the surface horizon. This results in the formation of soils in which the surface horizon is higher in organic matter content than the deeper horizons. The decomposition and mixing of organic residues into the soil horizons is brought about largely by the activity of living organisms. Many of the more stable products of decomposition remain as finely divided materials that contribute to the soil, increase the available water and cation exchange capacities, contribute to granulation, and serve as a source of plant nutrients.

The addition of alluvial sediment at the surface has been important in the formation of some of the soils in the parish. Added sediment provides new parent material that is altered by the processes of soil formation. In many places, new material accumulated faster than the processes of soil formation could appreciably alter it. The evident depositional strata in the Commerce, Convent, Norwood, and Roxana soils are a result of accumulation of this sort. Accumulation of sediments is also indicated by the contrasting textures in the Latanier soils and by thin lenses of silt loam or silty clay loam in lower horizons of some of the Fausse, Moreland, and Sharkey soils.

Processes resulting in development of soil structure have taken place in all the soils. Plant roots and other organisms are effective agents in the rearrangement of soil material into secondary aggregates. Decomposition products or organic residues, secretions of organisms, clays, and oxides of elements such as iron that form during soil development—all these serve as cementing agents that help stabilize structural aggregates. Alternate wetting and drying and shrinking and swelling contribute to the development of structural aggregates and are particularly effective in soils that have appreciable amounts of clay, for example, the Sharkey soil.

The poorly drained and very poorly drained soils in the survey area have horizons in which reduction and segregation of iron and manganese compounds have been important processes. Reduction conditions prevail for long periods of time in these poorly aerated horizons. Consequently, during these periods the somewhat soluble reduced forms of iron and manganese are predominant over the less soluble oxidized forms in the soil solution. Reduced forms of these elements can cause the gray colors that are characteristic of the Bg and Cg horizon in, for example, the Sharkey and Fausse soils. In the more soluble reduced forms, appreciable amounts of iron and manganese may be moved from the soils or translocated from one position to another within the soil by water. Brown mottles in predominantly gray horizons are indicative of segregation and the local concentration of oxidized iron compounds that results from alternate oxidizing and reducing conditions in the soils.

Loss of components has occurred to some extent during the formation of the soils. Water moving through the soil has leached soluble bases, and any free carbonates that may have been initially present, from some horizons of most of the soils. The effects of leaching are least pronounced in the Latanier, Moreland, Norwood, and Roxana soils. These soils formed in relatively young parent materials that initially contained free calcium carbonate. They all contain free calcium carbonate at some depth within the solum. The other soils in the survey area are more leached, and many are acid in the surface horizon and become neutral or alkaline at some depth within the solum. Only the Calhoun, Coteau, Dundee, Gore, Guyton, Kolin, Loring, McKamie, Memphis, Tensas, Vick, and Wrightsville soils are typically acid throughout the solum.

The formation, translocation, and accumulation of clay in the profile have been important processes during the development of all but the Commerce, Convent, Fausse, Latanier, Moreland, Norwood, Roxana, and Sharkey soils. Silicon and aluminum released as a result of weathering of such minerals as pyroxenes, amphiboles, and feldspar can recombine with the components of water to form secondary clay minerals such as kaolinite. Layer silicate minerals, such as biotite and montmorillonite, can also weather to form other clay minerals such as vermiculite or kaolinite. Horizons of secondary accumulation of clay result largely from translocation of clays from upper to lower horizons. As water moves downward it can carry small amounts of clay in suspension. This clay is deposited, and it accumulates at the depths of penetration of the water or in horizons where it becomes flocculated or filtered out by fine pores in the soil. Over long periods, such processes can result in distinct horizons of clay accumulation.

Secondary accumulation of calcium carbonate may occur in the lower part of the solum in some of the soils. Carbonates dissolved from overlying horizons may have been translocated to this depth by water and redeposited. Other sources and processes may contribute in varying degrees to carbonate accumulations; for example, segregation of material within the horizons, upward translocation of materials in solution from deeper horizons during fluctuations of water table levels, and contributions of materials from readily weatherable minerals such as plagioclase. Calcium carbonate was initially present in the soils that developed in the sediments deposited by the Red River. All of these but the Gallion and Solier soils typically contain calcium carbonate in some horizons within the solum. Calcium carbonate may be present in all horizons of the Latanier, Moreland, and Norwood soils at some locations.

factors of soil formation

Soil is a natural, three-dimensional body that formed on the earth's surface and that has properties resulting from the integrated effect of climate and living organisms acting on parent material, as conditioned by relief over time.

The interaction of five main factors influences the processes of soil formation and results in differences among the soils. These factors are the physical and chemical composition of the parent material, the climate during the formation of the soil from the parent material, the kind of plants and other organisms living in and on the soil, the relief of the land and its effect on runoff and soil moisture conditions, and the length of time it took the soil to form (*8, 14*).

The effect of a factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. Many of the differences in soils cannot be attributed to differences in only one factor. For example, organic matter content in the soils in the survey area is influenced by several factors, including relief, parent material, and living organisms. This does not diminish the importance of the influence of any given factor on a specific soil property. In the following paragraphs the factors of soil formation are discussed as they relate to soils in the survey area.

climate

Avoyelles Parish is in a region characterized by a humid, subtropical climate. Discussion of the climate appears in this report in the section "General nature of the parish."

The climate is generally uniform throughout the parish; therefore, local differences in soils which developed in parent materials similar in age are not due to differences in atmospheric climate. There are wide differences in the degree of weathering, leaching, and translocation of clay among the soils in the parish. Variations in time, relief, and parent material, rather than in climate, are chiefly responsible for these differences. The warm average temperatures and large amounts of precipitation favor a rapid rate of weathering. Weathering and leaching have occurred to some extent in most soils. They are indicated by soil reaction that is typically less acid in the lower horizons than in the upper horizons as is apparent in even the highly leached Memphis and Coteau soils. Weathering processes which have resulted in the release and reduction of iron are shown in the gray Ag, Bg, or Cg horizons of the Fausse and Sharkey soils. Oxidation and segregation of iron, the result of alternating oxidizing and reducing conditions, is indicated by mottled horizons in almost all the soils.

The effect of climate is also shown in the clayey soils that have large amounts of expanding-lattice minerals, in which large changes in volume occur upon wetting and drying. Wetting and drying cycles and associated volume changes contribute to the formation and stabilization of structural aggregates in the soils. When the wet soils dry out, cracks of variable width and depth may form as a result of the decrease in volume. Climate influences the formation of these cracks and the depth and extent of cracking. Repeated large changes in volume frequently result in structural problems if the soils are used for buildings, roads, and other improvements. Formation of deep, wide cracks may shear roots of plants growing in the soil. If cracks are present, much of the water from rainfall or irrigation initially enters the soil through the cracks; once the soil has become wet, however, infiltration rates are slow or very slow. Cracks form extensively in the Sharkey, Gore, Latanier, McKamie, Moreland, and Tensas soils late in summer and early in fall when the soils are driest. Cracks an inch or more wide extend to a depth of more than 20 inches in most years. Cracks that are less extensive and less deep sometimes form in the more silty Commerce soils and the clayey Fausse soils. The Sharkey soils dry to greater depths than the Fausse soils and have deeper cracks.

living organisms

Living organisms affect the process of soil formation in a number of ways and exert a major influence on the kind and extent of horizons that develop. Soil porosity, structure, and the incorporation of organic matter are influenced by the growth of plants and activity of other organisms that physically disturbed the soil. Photosynthesis of plants, which utilizes energy from the sun to synthesize compounds necessary for growth, produces additional organic matter. Growth and the eventual decomposition of plants provide for recycling of nutrients from the soil and serve as major sources of organic residue. The process of decomposition and incorporation of organic matter into the soil by micro-organisms furthers the development of structure and generally increases the infiltration rate and available water capacity in soils.

Relatively stable organic compounds in soils generally have very high cation exchange capacities. These compounds increase the capacity of the soil to absorb and store nutrients such as calcium, magnesium, and potassium. The extent of these and other processes and the kind of organic matter produced can vary widely, depending on the kinds of organisms living in and on the soil. Consequently, large differences in soils may result in areas that have widely contrasting numbers of plants and other organisms.

The soils in Avoyelles Parish developed under tall grass prairie, southern hardwood, or mixed hardwood-pine native vegetation. The Crowley Variant and Coteau soils developed on the upland terrace under a tall grass prairie vegetation.

The native vegetation of the soils developed in recent stream alluvium consists mainly of southern hardwood forests and their associated understory and ground cover. Eastern cottonwood, American sycamore, and pecan are predominant on the higher and better drained Commerce, Dundee, and Norwood soils. Oak, sweetgum, and green ash are predominant on the clayey, poorly drained Latanier, Moreland, and Sharkey soils. The major native trees on the clayey, very poorly drained Fausse soils are baldcypress, water tupelo, and water hickory. The Baldwin soils, formed in Mississippi River alluvium, probably developed under grassland vegetation. The remaining soils developed under a mixed hardwood-pine vegetation.

Differences in the amount of organic matter that has accumulated in and on the soils are greatly influenced by the kind and quantities of micro-organisms. Aerobic organisms utilize oxygen from the air and are chiefly responsible for organic matter decomposition through rapid oxidation of organic residue. These organisms are most abundant and prevail for longer periods in the better drained and better aerated Gallion, Norwood, Roxana, and Memphis soils. Anaerobic organisms do not require oxygen from the air, and they decompose organic residues very slowly. They are predominant throughout most or all of the year in the most poorly drained soils. Differences in decomposition by micro-organisms can result in large accumulations of organic matter, for example in the poorly drained Fausse soils; while in the better drained Norwood soils, the accumulation is much less.

relief

Relief and other physiographic features influence soil formation processes by affecting internal soil drainage, runoff, erosion, deposition, and exposure to the sun and wind.

The influence of relief on soils in Avoyelles Parish is especially evident in the rates at which water runs off the surface, in the internal soil drainage, and in the depth and duration of a seasonal high water table in the soils. For example, relief on the Covent, Commerce, Sharkey, and Fausse soils, which formed in Mississippi River alluvium, is progressively less in the order in which the soils are listed. The same order also indicates progressively lower elevations. For example, Convent soils typically occupy narrow, nearly level ridges, while Fausse soils occupy level or depressional areas. Rates of surface runoff are slow on Convent soils and become progressively slower through the list. Fausse soils have little or no runoff. Depth to and duration of a seasonal high water table show similar variations. A seasonal high water table is generally present for 4, 4, 5, and 12 months, respectively, in Convent, Commerce, Sharkey, and Fausse soils. Internal soil drainage is also more restricted with less relief and at lower elevations. Convent and Commerce soils are somewhat poorly drained, Sharkey soils are poorly drained, and Fausse soils are very poorly drained.

Similar relationships also exist in the soils that formed in other parent materials. Table 19 shows, by parent material, the relationship between slope, runoff, soil drainage, and depth and duration of a seasonal high water table for all of the soil series mapped in the parish.

parent material and time

The parent material is the material from which the soils developed. In the survey area the effects of parent material are particularly expressed in certain differences in soil color, texture, permeability, and depth and degree of leaching. Parent material has had a major influence on mineralogy of the soils and is a significant factor determining their susceptibility to erosion. The soils in the parish developed in unconsolidated materials deposited by water and wind. The characteristics, distribution, and depositional sequence of these materials are more thoroughly discussed in the section "Landforms and surface geology."

Parent material and time are independent factors of soil formation. For example, a particular kind of parent material may have been exposed to the processes of soil formation for periods ranging from a few years or less to more than a million years. The kinds of horizons within a soil and their degree of development are influenced by the length of time of soil formation. Long periods of time are generally required for prominent horizons to form. In the survey area, possible differences in the time of soil formation amount to several thousand years for some of the soils.

The soils in the parish have formed in at least five different parent materials, and for a number of the soils, these differences coincide approximately with differences in the time of exposure to processes of soil formation.

The Prairie Formation is the oldest exposed sediment in the parish and is the basic parent material of the Crowley Variant, Gore, Guyton, Kolin, McKamie, and Wrightsville soils. The Vick soils also formed in this parent material and in the loess that thinly mantles it. All of these soils occur mostly in the northwestern part of the parish, where accumulations of more recent deposits were thin. They contain a small admixture of the more recent deposits in the upper part in places, but most of the solum developed in sediments of the Prairie Formation. In the area of Avoyelles Parish, the Prairie Formation has been described as a relict alluvial plain characterized by largely clayey deposits (*13, 24*).

The Crowley Variant, Vick, and Wrightsville soils occupy level positions on the terrace uplands. The Guyton soils are in drainageways in the terrace uplands. The Gore, Kolin, and McKamie soils occupy the steeper positions in the more dissected areas and along drainageways. All the soils developed in the Prairie Formation are characterized by a B horizon that has secondary accumulations of clay and a reaction that is acid in the surface horizons and becomes less acid in the lower part of the solum. The Crowley Variant soil contains large quantities of exchangeable sodium within the solum. The Gore and Crowley Variant soils may, in places, contain secondary calcium carbonate concretions in or below the lower part of the solum.

Secondary accumulations of carbonates and high levels of exchangeable sodium in the solum of soils that formed in the oldest exposed sediments in the parish may be attributed, in part, to one or more of several factors: (1) Low permeability of the clayey sediments may have restricted leaching in sediments initially high in bases. (2) A high water table may have prevented the extensive movement of water required for the soils to become highly leached. (3) Secondary enrichment of any leached zones may have occurred as a result of deposition of bases from other sources because of fluctuating water tables. These and other factors can account for the relatively high base status or the presence of free carbonates in these soils; many soils that developed in younger sediments initially high in bases are more highly leached.

The Calhoun, Coteau, Deerford, Loring, and Memphis soils all developed in silty, wind-deposited materials (loess). In addition, Vick soils formed partially in loess, which covers the soil in a thin mantle. The loess is younger than the Prairie Formation deposits, which it overlies, and older than Red River sediments, which overlie the loessial deposits in part of the alluvial plain in parts of the parish.

Initially, the silty loess deposits were quite permeable to water. High permeability allows for transmission through the soil of the large volumes of water necessary for extensive leaching. As a result, the Memphis and Coteau soils, which developed in loess on the better drained landscape positions, are among the most highly leached soils in the parish. The soils that formed in loess have a wide range of slopes; they range from level to moderately steep. Because of the silty nature of the parent material the soils formed in loess are more erodible than the other soils in the area having comparable slopes. They have a surface layer of silt loam and a subsoil of silty clay loam or silt loam. The sand content is low throughout the profile and generally amounts to less than 10 percent. Recognizable horizons of clay accumulation have developed as a result of translocation of clay during soil formation.

Many characteristics of the soils that formed in loess differ widely. These differences are mostly a result of differences in relief and natural vegetation.

Mississippi River alluvial sediments are parent materials for the Baldwin, Commerce, Convent, Dundee, Dundee Variant, Fausse, Sharkey, and Tensas soils. These soils have formed in two different aged sediments. The Convent, Commerce, and Sharkey and Fausse soils, respectively, formed in the coarsest, intermediate, and finest textured parent materials in the youngest deposits.

A number of differences in these soils can be attributed, wholly or in part, to differences in the parent materials. For example, cation exchange capacity, organic matter content, and volume changes upon wetting and drying increase with increasing amounts of clay in the soil. Soil permeability, soil aeration, and content of readily weatherable minerals decrease with increasing clay content. Consequently, the silty soils are generally more productive for crops.

The Fausse soils formed in clayey deposits similar in nature to the parent material of the Sharkey soils. The major differences between Fausse and Sharkey soils are caused by factors other than parent material differences.

The Baldwin, Dundee, Dundee Variant, and Tensas soils developed in old Mississippi River alluvium. Dundee and Dundee Variant soil developed in the less clayey sediments occupying higher positions on the flood plain than those in which the Baldwin and Tensas soils formed.

Initially, the parent materials of Dundee and Dundee Variant soils were somewhat better drained and more permeable than the more clayey sediments in lower parts of the landscape. Consequently, Dundee soils are generally more leached in horizons near the surface and have more distinct profile development than the more clayey soils. These soils have a B horizon characterized by an accumulation of translocated clays. Baldwin and Tensas soils formed in areas where thin clayey deposits overlie loamy sediments.

Red River alluvial deposits are the parent materials of the Gallion, Latanier, Moreland, Norwood, Roxana, and Solier soils. The characteristic red colors and the presence of free carbonates are prominent features of these sediments at the time of deposition. The Lantanier, Moreland, Norwood, Roxana, and Solier soils formed in the youngest deposits and have undergone only slight leaching in the short time since deposition. The Roxana soils formed in more sandy parent materials than the other soils. They are leached free of carbonates to a depth of 20 inches or more. Solier soils formed in areas where thin clayey deposits overlie older, more highly leached, loamy materials.

Norwood soils formed in loamy deposits on natural levees, and Moreland soils formed in clayey backswamp areas. Latanier soils formed in areas where thin layers of clayey sediments were deposited on loamy materials. The Gallion soils formed in loamy-textured, old deposits on natural levees. They developed a B horizon that is more clayey than the surface horizon. These soils are somewhat leached, as is indicated by a soil reaction that typically is acid in the surface horizon and becomes more alkaline as depth increases. Typically, they are more acid and have lower natural fertility levels than soils that formed in the more recent deposits.

landforms and surface geology

Physiographically, Avoyelles Parish consists of two general areas: the alluvial plain, which occupies about 85 percent of the parish, and the terrace upland, which makes up the remaining 15 percent. In most places the two areas are separated by an abrupt escarpment that may rise 30 feet or more from the alluvial plain to the terrace upland. In others, they merge almost imperceptibly where more recent alluvium overlies gently sloping, low-lying areas of the terrace upland. Each of the two general areas can be further subdivided into two or more subareas distinguished by differences in either soil parent material or physiographic features, or both.

The surface features of the land and the nature and distribution of the different sediments in which the soils have formed are a result of events during and since the late Pleistocene Epoch. The major surface features, geologic nature, and relative ages of these areas are discussed in the following paragraphs.

terrace upland

The terrace upland occurs as an intermittent band extending from the northwest corner to the south-central boundary of the parish and restricted almost entirely to the western half of the survey area. Maximum elevation on the terrace upland ranges from appoximately 100 feet in the northwest corner to about 75 feet near the south-central parish boundary. The intermittent nature of the terrace upland is a result of the deposition of Red River alluvial sediments in low areas on the terrace and along present or former channels of the river where the flow has been generally southwest to northeast. The terrace upland corresponds to the Calhoun-Coteau-Loring, Memphis-Loring, Kolin-Vick, and Gore-McKamie-Guyton units of the general soil map. It consists of a Mississippi River Prairie Formation terrace meander that formed near the confluence of the Red River and the Mississippi River during Prairie time (*13*) and was later partially mantled with Peorian loess deposits. Relict alluvial morphology analogous to that of the modern Mississippi River alluvial plain can be recognized on the surface of much of the upland terrace (*13*). However, most of these soils appear to have formed in sediments derived predominately from ancient Red River sources. The sediments are mostly clayey and grade below the solum to materials with redder hues, which are characteristic of Mississippi River alluvium.

The material of the Prairie Formation terraces is the oldest soil parent material exposed in the parish and may have been deposited as much as 80,000 to 100,000 years ago (*24*). This formation is the parent material of Crowley Variant, Gore, Kolin, McKamie, Vick, and Wrightsville soils. Except for the Vick soils, these soils are restricted to areas where the loess mantle is less than about 2 feet thick. The loess mantle on the Vick soils is as thick as 3 feet in places. All of these soils are highly weathered and leached in at least the upper part of the solum and have a B horizon that is characterized by distinct secondary accumulations of illuvial clays.

Representative landscape positions of most of these soils are described under Kolin-Vick and Gore-McKamie-Guyton in the section "General soil map units." The influence of the Prairie Formation Red River sediments is illustrated by the red color of the lower part of the solum in the Kolin, Gore, and McKamie soils and by the red color of sediments beneath the solum in some areas of the Crowley Variant and Wrightsville soils. The Wrightsville soils occupy flat to depressional areas, the Crowley Variant soils occupy ridgetops and upper side slopes, and the Gore and McKamie soils are on the more steeply sloping side slopes.

Investigations conducted during the course of the survey indicated that throughout most of the area the terrace upland is mantled by uniform-textured, silty deposits that have very low sand content. These, in turn, are underlain by alluvial deposits of the Prairie Formation. The sediments in the Prairie Formation are generally clayey, but they have varying textures and are appreciably higher in sand content than the overlying loess. The silty deposits are thickest at the eastern edge of their area of occurrence and become progressively thinner to the west. They have texture, color, and distribution characteristics typically associated with loess (*9,11,26*).

A loess-mantled terrace at a lower elevation than the upland terrace was identified in the northeast corner of the parish during the survey. It is the Calhoun-Coteau-Loring unit on the general soil map. Thickness and distribution patterns are similar to those described for the upland terrace. More recent Red River alluvial deposits bury the western edge of the loess in this area.

An appreciable period of time elapsed between the deposition of the alluvial sediments and the deposition of the overlying loess. This is indicated by the presence, in many places, of recognizable horizons of soils that developed in the alluvial deposits and were later buried by loess. The area covered by loess corresponds approximately to the Calhoun-Coteau-Loring, Memphis-Loring, and part of the Kolin-Vick units shown on the general soil map.

The characteristics and distribution of the loess, the time of its deposition, and the source of the sediments in the lower Mississippi Valley have been the subject of a number of studies (*10,11,23,26,27*). Snowden studied loess deposits in the lower Mississippi Valley near Vickburg, Mississippi and found a rather uniform mineralogy. The loess was chiefly silt-sized quartz and feldspars; it averaged about 66 percent quartz, 20 percent carbonates, 5 percent feldspars, 7 percent clay minerals, and 2 percent accessory heavy minerals. Smectites dominated the clay mineral assemblage, and there were lesser amounts of illite and kaolinite. Typically, the loess deposits in the survey area are leached free of carbonates.

The loess throughout the southern Mississippi Valley is generally thought to have originated on the flood plain of the Mississippi River at a time when the river drained areas of active glaciation (*17,31*). Leighton and Willman have described in detail how, during dry periods, winds blowing across these flood plains transport and deposit silty materials over adjacent areas. Characteristically, the deposits are uniformly thinner with increasing distance from the source. Their maximum thickness in Avoyelles Parish is a little more than 10 feet along part of the eastern edge of the area, and they become progressively thinner to the west.

More than one interval of loess deposition has been indicated for some of the lower Mississippi Valley area, and somewhat differing times of deposition have been proposed. Saucier (*24*) indicates an age of about 20,000 years for loess in the area of Louisiana approximately 40 miles east of Avoyelles Parish. The loess in Avoyelles Parish covers most of the Prairie Formation terraces, which Saucier indicates are 80,000 to 100,000 years old. At lower elevations in the northeastern part of the parish, the loess is overlain by recent Red River alluvial deposits.

In most reports (*13,23,24*) these loessial deposits are either not described or are considered to be natural levee deposits of streams. A number of their characteristics, however, are inconsistent with those of natural levee deposits. Examples include the extreme width, uniform textures, and low sand content of the deposits. Throughout Avoyelles Parish the silty deposits are essentially uniform in texture, lack interstratified sand and clay lenses, typically have a sand content of less than 5 percent, and occur in a band several miles wide. This contrasts with the stratified natural levee deposits along the Mississippi River; those deposits range from sandy to clayey in texture within a band that generally extends less than 5 miles back from the river. In addition, the loess changes little in thickness across various kinds of topography except that it becomes thinner further from the source and forms a true mantle across the underlying topography (*10*). Alluvial deposits, on the other hand, tend to obliterate pre-existing topographic features, such as the meander belt of the terrace upland. Other characteristics inconsistent with natural levee deposits include the continuous nature of the loess deposts without regard to elevation; the presence beneath the loess of buried soils with distinct horizonation; and the limited erosion and scouring, which would be highly improbable during overflow of a stream large enough to form continuous natural levees several miles wide.

The Calhoun, Coteau, Deerford, Loring, and Memphis soils developed in loess. Memphis soils occur on convex ridges and the steeper side slopes in areas of the thickest loess. Deerford soils occupy low-lying loess-covered terraces. Typical landscape distribution patterns of the Loring, Calhoun, and Coteau soils are shown in the section "General soil map units."

Guyton soils developed in alluvial deposits in low areas and along channels that drain the terrace upland. They formed in sediments derived through erosion from the surrounding soil areas. They are highly weathered and acid throughout the solum. These soils have a silty clay loam B horizon characterized by a secondary accumulation of illuvial clays. Silt loam textures are in horizons higher and lower in the solum. Guyton soils formed in sediments that are late Pleistocene to mid-Holocene in age.

alluvial plain

The alluvial plain that makes up about 85 percent of the parish consists almost entirely of recent deposits of the Red and Mississippi Rivers. Sediments derived from erosion of local soil materials are minor. They occur only in very small areas near the terrace uplands along drainageways that flow out of the terraces onto the alluvial plain. On the general soil map, the alluvial plain is all the area not identified as Calhoun-Coteau-Loring, Memphis-Loring, Kolin-Vick, and Gore-McKamie-Guyton soils.

Initial differences in sediments carried by the Red and Mississippi Rivers and the partial sorting of these sediments during deposition result in wide differences in the deposits. Partial sorting of these materials occurs when the strem overflows and the initial decrease in the velocity and transporting capacity of the water results in rapid deposition of sediments. The initial deposits are high in content of sand. They are followed by sediments high in content of silt which, in turn, are followed by more clayey deposits. The clayey backswamp sediments are deposited from still or slowly moving water in low areas in back of the coarser textured natural levees. Characteristically, this depositional pattern results in the formation of long, nearly level slopes that extend from the natural levees near the stream to the clayey backswamp deposits. The depositional pattern and differences in flooding frequency and intensity can result in complex sediment distribution patterns and interfingering of materials near the confluence of streams. Irregular undulating or ridge and swale topography, intricate and complex drainage patterns, and a lack of drainage outlets in low areas are commonplace features where the confluence of major streams is within a large alluvial plain. These features are typical of much of the Sharkey-Tensas and Sharkey-Fausse-Moreland units on the general soil map.

The major part of the alluvial plain is composed of surface deposits of the Red River. Sediments transported by the Red River originated mostly in the more arid regions to the north and west. They are dominantly materials derived from erosion of the older Permian red beds, which give them the characteristic red color. At the time of deposition, they were relatively unweathered and typically contained free calcium carbonate. Only after considerable time and leaching did acid soil horizons develop. Soils developed in Red River sediments of at least two different ages. Those formed in the younger sediments are the Latanier, Moreland, Norwood, Roxana, or Solier soils. The Gallion soils formed in the older deposits.

The Roxana soils are typically on the highest and sandiest parts of the natural levee nearest the river and contain less clay than other soils developed in these deposits. The Norwood soils formed in loamy deposits on the natural levee farther from the river and contain less sand and more silt and clay than the Roxana soils. Moreland soils formed in thick, clayey backswamp deposits. The Latanier soils are in places where thin, clayey deposits overlie loamy deposits of the Red River. Solier soils formed where thin, clayey deposits overlie loess or silty alluvium along low stream terraces. The coarser textured deposits correspond to the Roxana-Norwood and Norwood map units, and the more clayey deposits correspond to the Moreland-Latanier, Moreland-Solier, and part of the Sharkey-Fausse-Moreland units on the general soil map.

The Gallion soils formed in the oldest Red River deposits on the alluvial plain. The major areas are in the south-central part of the parish. These soils formed in loamy sediments that are perhaps 2,000 years or more old. They are similar in landscape position to the Roxana and Norwood soils that formed in more recent deposits. They are leached free of carbonates throughout the upper part of the solum and have a B horizon characterized by distinct secondary accumulations of illuvial clay.

Mississippi River alluvial deposits make up less of the alluvial plain than the Red River deposits. Soils developed in Mississippi River deposits of at least two different ages. The Convent, Commerce, Sharkey, and Fausse soils formed in the younger sediments; the Baldwin, Dundee, Dundee Variant, and Tensas soils formed in the older sediments. The Convent-Commerce, Sharkey, Sharkey-Tensas, and Sharkey-Fausse-Moreland units on the general soil map are made up predominantly of the younger soils.

Mineralogical studies (*27*) of the alluvium indicate that smectite minerals are predominant in the clay-size fraction, and secondary amounts of micaceous clays are also present. Associated with these materials are lesser amounts of kaolinite, chlorite-vermiculite intergrade, and quartz minerals. The sand- and silt-size fractions are made up largely of quartz but also include sizable amount of feldspar and smaller amounts of a variety of minerals, including such readily weatherable components as beotite and hornblende.

The Convent, Commerce, and Sharkey and Fausse soils, respectively, formed in medium, moderately fine, and fine textured parent materials and typically occur in the order named from highest to lowest position on the landscape. A number of differences in these soils can be attributed, wholly or in part, to differences in the parent material. For example, cation exchange capacity, organic matter content, and volume changes upon wetting and drying increase with increasing amounts of clay in the soils. Soil permeability, soil aeration, and content of readily weatherable minerals decrease with increasing clay content. The Fausse and Sharkey soils developed in similar clayey deposits. The major differences between them are due to factors other than parent material.

The Baldwin, Dundee, Dundee Variant, and Tensas soils developed in the oldest Mississippi River alluvial deposits on the alluvial plain. These soils formed in sediments that are 2,000 to 3,000 years or more old. The Dundee and Dundee Variant soils are similar in landscape position to the Convent and Commerce soils that formed in more recent sediments. The Baldwin and Tensas soils occupy lower positions where clayey sediments were deposited over loamy materials. These soils are all more leached and weathered through the solum than analogous soils that developed by distinct secondary accumulations of illuvial clay.

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glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separates, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1957-73 at Bunkie, Louisiana]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	57.8	36.9	47.2	79	17	66	4.60	1.97	6.72	7	0.1
February---	61.6	39.8	50.7	81	23	136	4.52	2.61	6.07	6	.5
March------	68.7	45.8	57.3	84	27	261	5.23	2.02	7.82	7	.0
April------	78.5	56.2	67.4	90	36	522	5.33	1.76	8.18	6	.0
May---------	84.8	62.5	73.6	94	47	732	5.22	2.50	7.44	6	.0
June--------	90.7	69.0	79.9	98	57	897	4.79	1.90	7.12	6	.0
July--------	92.3	71.5	81.9	100	63	989	5.27	2.39	7.61	7	.0
August------	91.7	70.1	80.9	99	59	958	4.37	1.26	6.89	6	.0
September--	87.6	65.7	76.9	96	49	807	5.18	1.86	7.84	6	.0
October----	80.0	54.6	67.3	92	37	536	4.59	.89	7.49	4	.0
November---	69.7	45.8	57.8	87	26	262	4.74	1.50	7.35	5	.0
December---	61.9	39.6	50.7	79	19	141	7.41	3.87	10.30	7	.0
Yearly:											
Average--	77.1	54.8	66.0	---	---	---	---	---	---	---	---
Extreme--	---	---	---	101	17	---	---	---	---	---	---
Total----	---	---	---	---	---	6,307	61.25	52.19	69.84	73	0.6

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1957-73 at Bunkie, LA]

Probability	Temperature 24°F or lower	28°F or lower	32°F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	February 11	March 8	March 19
2 years in 10 later than--	February 5	February 28	March 13
5 years in 10 later than--	January 22	February 13	March 1
First freezing temperature in fall:			
1 year in 10 earlier than--	December 2	November 17	October 27
2 years in 10 earlier than--	December 10	November 24	November 4
5 years in 10 earlier than--	December 28	December 7	November 19

TABLE 3.--GROWING SEASON

[Recorded in the period 1957-73 at Bunkie, LA]

Probability	Daily minimum temperature during growing season: Higher than 24°F	Higher than 28°F	Higher than 32°F
	Days	Days	Days
9 years in 10	303	267	234
8 years in 10	313	277	244
5 years in 10	340	297	262
2 years in 10	>365	316	281
1 year in 10	>365	326	290

TABLE 4.--SUITABILITY AND LIMITATIONS OF MAP UNITS ON THE GENERAL SOIL MAP FOR SPECIFIED USES

Map unit	Percent of area	Cultivated crops	Pasture	Woodland	Urban uses
1. Roxanna-Norwood	7	Well suited	Well suited	Well suited	Well suited.
2. Norwood	11	Well suited	Well suited	Well suited	Well suited.
3. Gallion	3	Well suited	Well suited	Well suited	Moderately well suited: shrink-swell, moderate permeability.
4. Convent-Commerce	1	Well suited	Well suited	Well suited	Moderately well suited: shrink-swell, wetness.
5. Dundee	3	Moderately well suited: wetness.	Well suited	Well suited	Moderately well suited: wetness, shrink-swell, moderately slow permeability.
6. Moreland-Latanier	22	Moderately well suited: wetness, poor tilth.	Well suited	Well suited	Poorly suited: wetness, flooding, shrink-swell, very slow permeability.
7. Moreland-Solier	5	Moderately well suited: wetness, poor tilth.	Well suited	Well suited	Poorly suited: wetness, flooding, shrink-swell, very slow permeability.
8. Sharkey	4	Moderately well suited: wetness, poor tilth.	Moderately well suited: wetness.	Well suited	Poorly suited: wetness, flooding, shrink-swell, very slow permeability.
9. Sharkey-Tensas	19	Moderately well suited: wetness, poor tilth, flooding.	Moderately well suited: flooding, wetness.	Well suited	Poorly suited: flooding, wetness, very slow permeability.
10. Sharkey-Fausse-Moreland	8	Poorly suited: flooding, wetness.	Poorly suited: flooding, wetness.	Poorly suited: flooding, wetness.	Poorly suited: wetness, flooding, shrink-swell, very slow permeability.
11. Calhoun-Coteau-Loring	10	Well suited	Well suited	Well suited	Moderately well suited: wetness, slow permeability.
12. Memphis-Loring	1.5	Well suited	Well suited	Well suited	Moderately well suited: slope, slow permeability.
13. Kolin-Vick	3	Moderately well suited: slope, wetness.	Well suited	Well suited	Moderately well suited: wetness, slow permeability.
14. Gore-McKamie-Guyton	2.5	Poorly suited: slope, flooding.	Moderately well suited: flooding.	Moderately well suited: flooding.	Poorly suited: slope shrink-swell, very slow permeability.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Bd	Baldwin silty clay loam	813	0.1
Ca	Calhoun silt loam	23,399	4.3
Cm	Commerce silt loam	1,121	0.2
Cn	Convent very fine sandy loam	2,193	0.4
Cu	Convent very fine sandy loam, occasionally flooded	1,317	0.2
Cv	Coteau silt loam, 1 to 3 percent slopes	16,280	3.0
Cw	Crowley Variant silt loam	1,182	0.2
Da	Deerford silt loam	1,028	0.2
Dd	Dundee silt loam	3,040	0.6
De	Dundee silty clay loam	1,847	0.3
Dn	Dundee silty clay loam, occasionally flooded	5,475	1.0
Ds	Dundee-Sharkey complex, gently undulating	5,065	0.9
Dv	Dundee Variant clay	1,046	0.2
Fa	Fausse clay	13,862	2.5
Ga	Gallion silt loam	8,745	1.6
Go	Gallion silty clay loam	5,181	1.0
Gr	Gore silt loam, 1 to 5 percent slopes	6,110	1.1
Gy	Guyton silt loam, frequently flooded	3,491	0.6
Ko	Kolin silt loam, 1 to 5 percent slopes	9,389	1.7
La	Latanier clay	15,391	2.8
Ln	Latanier clay, occasionally flooded	2,004	0.4
Lo	Lorine silt loam, 0 to 2 percent slopes	7,156	1.3
Lr	Loring silt loam, 2 to 5 percent slopes	3,633	0.7
Ma	McKamie silt loam, 5 to 12 percent slopes	4,275	0.8
Me	Memphis silt loam, 0 to 2 percent slopes	2,156	0.4
Mh	Memphis silt loam, 2 to 5 percent slopes	1,546	0.3
Mm	Memphis silt loam, 8 to 20 percent slopes	2,628	0.5
Mo	Moreland silt loam	2,939	0.5
Mr	Moreland silt loam, occasionally flooded	731	0.1
Ms	Moreland clay	81,238	15.0
Mt	Moreland clay, occasionally flooded	23,772	4.4
Mu	Moreland clay, gently undulating, occasionally flooded	5,274	1.0
Mw	Moreland clay, frequently flooded	15,854	2.9
Nd	Norwood silt loam	35,515	6.6
No	Norwood silt loam, occasionally flooded	4,398	0.8
Nr	Norwood silty clay loam	16,819	3.1
Nw	Norwood silty clay loam, occasionally flooded	6,383	1.2
Ra	Roxana very fine sandy loam	5,325	1.0
Rn	Roxana very fine sandy loam, gently undulating	6,372	1.2
Ro	Roxana very fine sandy loam, undulating	4,486	0.8
Ru	Roxana very fine sandy loam, gently undulating, occasionally flooded	11,544	2.1
Rx	Roxana very fine sandy loam, frequently flooded	1,190	0.2
Sa	Sharkey clay	14,975	2.8
Se	Sharkey clay, overwash, occasionally flooded	29,591	5.4
Sh	Sharkey clay, overwash, gently undulating, occasionally flooded	21,315	3.9
Sk	Sharkey clay, overwash, frequently flooded	21,399	3.9
So	Solier clay	8,931	1.6
Sr	Solier clay, occasionally flooded	4,010	0.7
Ta	Tensas silty clay	3,673	0.7
Te	Tensas silty clay, overwash, occasionally flooded	10,004	1.8
Tn	Tensas-Sharkey complex, undulating	5,241	1.0
Ts	Tensas-Sharkey complex, overwash, undulating, occasionally flooded	26,836	5.0
Vk	Vick silt loam	5,882	1.1
Wr	Wrightsville silt loam	840	0.2
	Small water	2,532	0.5
	Large water*	17,558	3.2
	Total	544,000	100.0

*Bodies of water larger than 40 acres.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Sugarcane	Soybeans	Cotton lint	Rice	Common bermudagrass	Improved bermudagrass
	Ton	Bu	Lb	Bu	AUM*	AUM*
Bd----------------------- Baldwin	30	36	---	120	9.0	15.1
Ca----------------------- Calhoun	---	25	400	120	---	---
Cm----------------------- Commerce	35	40	900	---	9.3	16.7
Cn----------------------- Convent	32	40	875	---	9.3	16.7
Cu----------------------- Convent	---	35	---	---	8.5	15.5
Cv----------------------- Coteau	27	32	450	---	5.5	11.3
Cw----------------------- Crowley Variant	---	28	---	130	5.5	11.3
Da----------------------- Deerford	---	30	475	---	6.1	10.5
Dd, De------------------- Dundee	---	40	750	---	9.0	15.1
Dn----------------------- Dundee	---	35	---	---	8.0	14.7
Ds----------------------- Dundee-Sharkey	---	33	662	---	7.5	12.5
Dv----------------------- Dundee Variant	---	40	750	---	8.2	15.5
Fa----------------------- Fausse	---	---	---	---	---	---
Ga----------------------- Gallion	33	40	875	---	9.0	15.2
Go----------------------- Gallion	33	40	825	---	8.0	13.0
Gr----------------------- Gore	---	23	---	---	4.5	10.1
Gy----------------------- Guyton	---	---	---	---	5.0	---
Ko----------------------- Kolin	---	25	---	---	5.5	12.6
La, Ln------------------- Latanier	30	40	675	130	7.2	13.1
Lo----------------------- Loring	---	35	750	---	5.5	12.5
Lr----------------------- Loring	---	30	700	---	5.3	12.0

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Sugarcane	Soybeans	Cotton lint	Rice	Common bermudagrass	Improved bermudagrass
	Ton	Bu	Lb	Bu	AUM*	AUM*
Ma------------------------ McKamie	---	---	---	---	4.5	10.1
Me------------------------ Memphis	---	40	800	---	6.5	13.8
Mh------------------------ Memphis	---	35	750	---	6.0	13.5
Mm------------------------ Memphis	---	---	---	---	5.0	10.0
Mo------------------------ Moreland	30	37	625	130	6.0	12.0
Mr------------------------ Moreland	---	33	---	---	5.5	---
Ms------------------------ Moreland	30	37	625	130	6.0	12.0
Mt, Mu-------------------- Moreland	---	28	---	---	5.5	---
Mw------------------------ Moreland	---	---	---	---	4.3	---
Nd------------------------ Norwood	35	40	900	---	9.5	16.7
No------------------------ Norwood	---	37	850	---	8.0	14.7
Nr------------------------ Norwood	35	40	875	---	9.5	16.7
Nw------------------------ Norwood	---	37	850	---	8.0	14.7
Ra------------------------ Roxana	32	40	875	---	9.0	16.0
Rn------------------------ Roxana	30	40	850	---	8.5	15.5
Ro------------------------ Roxana	---	32	800	---	8.5	15.5
Ru------------------------ Roxana	---	37	800	---	8.5	15.5
Rx------------------------ Roxana	---	---	---	---	6.0	---
Sa------------------------ Sharkey	30	35	650	130	6.5	12.0
Se, Sh-------------------- Sharkey	---	25	---	---	6.0	---
Sk------------------------ Sharkey	---	---	---	---	5.0	---
So------------------------ Solier	---	40	---	130	6.0	12.0
Sr------------------------ Solier	---	35	---	130	6.0	---

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Sugarcane	Soybeans	Cotton lint	Rice	Common bermudagrass	Improved bermudagrass
	Ton	Bu	Lb	Bu	AUM*	AUM*
Ta------------------------- Tensas	---	40	600	130	6.5	12.5
Te------------------------- Tensas	---	30	---	---	6.0	---
Tn------------------------- Tensas-Sharkey	---	35	---	---	6.0	11.5
Ts------------------------- Tensas-Sharkey	---	30	---	---	6.0	---
Vk------------------------- Vick	---	28	---	---	6.1	10.0
Wr------------------------- Wrightsville	---	25	450	120	5.5	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	58,897	---	---	---	---
II	84,921	27,831	57,090	---	---
III	187,746	13,875	---	173,871	---
IV	129,647	6,110	123,537	---	---
V	41,934	---	41,934	---	---
VI	6,903	6,903	---	---	---
VII	13,862	---	13,862	---	---
VIII	---	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
Bd: Baldwin	2w6	Slight	Severe	Moderate	Severe	Green ash	80	Eastern cottonwood, sweetgum, American sycamore.
						Eastern cottonwood	100	
						Water oak	90	
						Pecan	---	
						Sweetgum	90	
						American sycamore	---	
						Sugarberry	---	
Ca: Calhoun	2w9	Slight	Severe	Moderate	Severe	Cherrybark oak	---	Loblolly pine, slash pine.
						Water oak	---	
						Sweetgum	---	
						Loblolly pine	90	
						Slash pine	90	
Cm: Commerce	1w5	Slight	Moderate	Slight	Severe	Green ash	80	Eastern cottonwood, American sycamore.
						Eastern cottonwood	120	
						Nuttall oak	90	
						Water oak	110	
						Pecan	---	
						American sycamore	---	
						Sugarberry	---	
Cn, Cu: Convent	1w5	Slight	Moderate	Slight	Severe	Green ash	80	Eastern cottonwood, American sycamore.
						Eastern cottonwood	120	
						Sweetgum	110	
						American sycamore	---	
						Nuttall oak	90	
						Water oak	---	
						Pecan	---	
						Sugarberry	---	
Cv: Coteau	1w8	Slight	Moderate	Slight	Moderate	Loblolly pine	100	Loblolly pine, slash pine.
						Slash pine	---	
						Water oak	90	
						Cherrybark oak	90	
Cw: Crowley Variant	2w9	Slight	Severe	Moderate	Severe	Loblolly pine	90	Loblolly pine.
Da: Deerford	2w8	Slight	Moderate	Slight	Severe	Sweetgum	86	Loblolly pine, slash pine.
						Loblolly pine	92	
						Slash pine	92	
						Water oak	82	
Dd, De, Dn: Dundee	2w5	Slight	Moderate	Slight	Moderate	Nuttall oak	105	Cherrybark oak, eastern cottonwood, sweetgum, water oak,
						Eastern cottonwood	100	
						Sweetgum	100	
						Water oak	95	
Ds*:								
Dundee	2w5	Slight	Moderate	Slight	Moderate	Nuttall oak	105	Cherrybark oak, eastern cottonwood, sweetgum, water oak.
						Eastern cottonwood	100	
						Sweetgum	100	
						Water oak	95	
Sharkey	2w6	Slight	Severe	Moderate	Severe	Green ash	85	Eastern cottonwood, American sycamore, sweetgum.
						Eastern cottonwood	100	
						Nuttall oak	90	
						Sweetgum	90	
						Water oak	---	
						Pecan	---	
						American sycamore	---	
						Sugarberry	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Potential productivity: Common trees	Site index	Trees to plant
Dv----------------- Dundee Variant	2w6	Slight	Moderate	Slight	Moderate	Nuttall oak--------- Water oak----------- Sugarberry----------	--- --- ---	Eastern cottonwood, sweetgum, water oak.
Fa----------------- Fausse	4w6	Slight	Severe	Severe	Severe	Baldcypress--------- Water hickory------- Water tupelo-------- Overcup oak--------- Black willow--------	--- --- --- --- ---	Baldcypress.
Ga, Go------------- Gallion	2o4	Slight	Slight	Slight	Moderate	Green ash----------- Nuttall oak--------- Sweetgum------------ Water oak----------- Pecan--------------- American sycamore--- Eastern cottonwood--	80 95 83 --- --- --- 100	Eastern cottonwood, American sycamore.
Gr----------------- Gore	3c2	Slight	Moderate	Moderate	Moderate	Loblolly pine------- Longleaf pine------- Slash pine----------	78 --- ---	Loblolly pine, slash pine.
Gy----------------- Guyton	2w9	Slight	Severe	Moderate	Severe--	Loblolly pine------- Slash pine---------- Sweetgum------------ Green ash----------- Southern red oak---- Water oak-----------	90 90 --- --- --- ---	Loblolly pine, sweetgum.
Ko----------------- Kolin	3w8	Slight	Moderate	Slight	Moderate	Loblolly pine------- Longleaf pine------- Slash pine---------- Sweetgum------------	85 --- --- ---	Loblolly pine, slash pine.
La, Ln------------- Latanier	2w6	Slight	Moderate	Moderate	Severe	Green ash----------- Nuttall oak--------- Water oak----------- Pecan--------------- Sweetgum------------ Sugarberry----------	80 90 90 --- 90 ---	Eastern cottonwood, American sycamore.
Lo, Lr------------- Loring	2o7	Slight	Slight	Slight	Severe	Cherrybark oak------ Loblolly pine------- Shortleaf pine------ Sweetgum------------ Water oak-----------	86 95 90 90 90	Loblolly pine, shortleaf pine, cherrybark oak, sweetgum, yellow-poplar.
Ma----------------- McKamie	3c2	Slight	Moderate	Moderate	Moderate	Loblolly pine------- Slash pine---------- Longleaf pine-------	85 85 ---	Loblolly pine, slash pine.
Me, Mh, Mm--------- Memphis	1o7	Slight	Slight	Slight	Moderate	Cherrybark oak------ Loblolly pine------- Sweetgum------------ Water oak-----------	100 105 90 90	Cherrybark oak, loblolly pine, sweetgum, yellow-poplar.
Mo----------------- Moreland	2w6	Slight	Severe	Moderate	Severe	Green ash----------- Sweetgum------------ Water oak----------- Nuttall oak--------- Sugarberry----------	75 90 90 90 ---	Eastern cottonwood, American sycamore.
Mr----------------- Moreland	3w5	Slight	Severe	Severe	Severe	Green ash----------- Sweetgum------------ Water oak----------- Nuttall oak--------- Sugarberry----------	70 80 80 80 ---	Eastern cottonwood, American sycamore.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
Ms------------------ Moreland	2w6	Slight	Severe	Moderate	Severe	Green ash-----------	75	Eastern cottonwood, American sycamore.
						Sweetgum------------	90	
						Water oak-----------	90	
						Nuttall oak---------	90	
						Sugarberry----------	---	
Mt, Mu-------------- Moreland	3w6	Slight	Severe	Severe	Severe	Green ash-----------	70	Eastern cottonwood, American sycamore, green ash.
						Sweetgum------------	80	
						Water oak-----------	80	
						Nuttall oak---------	80	
Mw------------------ Moreland	3w6	Slight	Severe	Severe	Severe	Water hickory-------	---	Baldcypress, green ash.
						Overcup oak---------	---	
						Baldcypress---------	---	
						Black willow--------	---	
						Water locust--------	---	
						Green ash-----------	---	
Nd, No, Nr, Nw------ Norwood	1o4	Slight	Slight	Slight	Moderate	Eastern cottonwood--	100	Eastern cottonwood, American sycamore, sweetgum.
						Sugarberry----------	---	
Ra, Rn, Ro, Ru------ Roxana	1o4	Slight	Slight	Slight	Moderate	Eastern cottonwood--	115	Eastern cottonwood, American sycamore.
						Sweetgum------------	100	
						Pecan---------------	---	
						American sycamore---	---	
						Water oak-----------	---	
						Nuttall oak---------	---	
						Sugarberry----------	---	
Rx------------------ Roxana	2w5	Slight	Moderate	Moderate	Moderate	Black willow--------	---	Eastern cottonwood.
						Eastern cottonwood--	---	
Sa------------------ Sharkey	2w6	Slight	Severe	Moderate	Severe	Green ash-----------	85	Eastern cottonwood, American sycamore, sweetgum.
						Nuttall oak---------	90	
						Sweetgum------------	90	
						Willow oak----------	---	
						Water oak-----------	---	
						Pecan---------------	---	
						Honey locust--------	---	
						Sugarberry----------	---	
						Nuttall oak---------	---	
Se, Sh,------------- Sharkey	3w6	Slight	Severe	Severe	Severe	Green ash-----------	---	Eastern cottonwood.
						Sugarberry----------	---	
						Honey locust--------	---	
Sk------------------ Sharkey	3w6	Slight	Severe	Severe	Severe	Water hickory-------	---	Baldcypress, green ash.
						Overcup oak---------	---	
						Baldcypress---------	---	
						Black willow--------	---	
						Water locust--------	---	
						Green ash-----------	---	
So, Sr-------------- Solier	2w6	Slight	Severe	Moderate	Severe	Overcup oak---------	86	Eastern cottonwood, American sycamore.
						Nuttall oak---------	88	
						Water hickory-------	---	
						Green ash-----------	---	
						Water oak-----------	88	
						Sugarberry----------	---	
Ta------------------ Tensas	2w6	Slight	Severe	Moderate	Severe	Green ash-----------	80	Eastern cottonwood, American sycamore, Sweetgum.
						Water oak-----------	95	
						Sweetgum------------	100	
						Pecan---------------	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Te----------------- Tensas	3w6	Slight	Severe	Severe	Severe	Green ash-----------	70	Eastern cottonwood.
						Nuttall oak---------	80	
						Water hickory-------	---	
						Sugarberry----------	---	
						Honey locust--------	---	
						Pecan---------------	---	
Tn*:								
Tensas------------	2w6	Slight	Severe	Moderate	Severe	Green ash-----------	80	Eastern cottonwood, American sycamore, sweetgum.
						Water oak-----------	95	
						Sweetgum------------	100	
						Pecan---------------	---	
						Sugarberry----------	---	
Sharkey-----------	2w6	Slight	Severe	Moderate	Severe	Green ash-----------	85	Eastern cottonwood, American sycamore, sweetgum.
						Nuttall oak---------	90	
						Sweetgum------------	90	
						Water oak-----------	---	
						Pecan---------------	---	
						Sugarberry----------	---	
Ts*:								
Tensas------------	3w6	Slight	Severe	Severe	Severe	Green ash-----------	70	Eastern cottonwood, baldcypress. sweetgum.
						Sugarberry----------	---	
						Nuttall oak---------	80	
						Pecan---------------	---	
						Honey locust--------	---	

Sharkey-----------	3w6	Slight	Severe	Severe	Severe	Green ash-----------	---	Eastern cottonwood.
						Nuttall oak---------	---	
						Sugarberry----------	---	
						Honey locust--------	---	
Vk----------------- Vick	2w8	Slight	Moderate	Moderate	Severe	Loblolly pine-------	87	Loblolly pine, slash pine.
						Shortleaf pine------	77	
						Southern red oak----	80	
						Water oak-----------	86	
						Sweetgum------------	86	
						Slash pine----------	87	
Wr----------------- Wrightsville	3w9	Slight	Severe	Moderate	Severe	Loblolly pine-------	80	Loblolly pine, sweetgum, water oak, willow oak.
						Sweetgum------------	80	
						Water oak-----------	80	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Bd: Baldwin	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Ca: Calhoun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Cm: Commerce	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Cn: Convent	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Cu: Convent	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Cv: Coteau	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Cw: Crowley Variant	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Da: Deerford	Severe: wetness, excess sodium.	Severe: wetness, excess sodium.	Severe: wetness, excess sodium.	Severe: wetness.	Severe: excess sodium, wetness.
Dd, De: Dundee	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Dn: Dundee	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Ds*:					
Dundee	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
Sharkey	Severe: wetness, percs slowly, flooding.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Dv: Dundee Variant	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
Fa: Fausse	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, excess humus.	Severe: too clayey, excess humus, ponding.	Severe: ponding, too clayey, excess humus.	Severe: ponding, flooding, too clayey.
Ga: Gallion	Slight	Slight	Slight	Slight	Slight.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Go: Gallion	Slight	Slight	Slight	Slight	Slight.
Gr: Gore	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Severe: erodes easily.	Slight.
Gy: Guyton	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ko: Kolin	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Moderate: wetness.
La: Latanier	Severe: wetness, percs slowly, flooding.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Ln: Latanier	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Lo: Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
Lr: Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
Ma: McKamie	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Me: Memphis	Slight	Slight	Slight	Slight	Slight.
Mh: Memphis	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
Mm: Memphis	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Mo: Moreland	Severe: wetness, percs slowly, flooding.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Mr: Moreland	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ms: Moreland	Severe: wetness, percs slowly, flooding.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Mt, Mu: Moreland	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Mw: Moreland	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
Nd: Norwood	Slight	Slight	Slight	Slight	Slight.
No: Norwood	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Nr: Norwood	Slight	Slight	Slight	Slight	Slight.
Nw: Norwood	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Ra: Roxana	Slight	Slight	Slight	Slight	Slight.
Rn, Ro: Roxana	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
Ru: Roxana	Severe: flooding.	Slight	Moderate: slope, flooding.	Severe: erodes easily.	Moderate: flooding.
Rx: Roxana	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: floods.	Severe: flooding.
Sa: Sharkey	Severe: wetness, percs slowly, flooding.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Se, Sh: Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Sk: Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
So, Sr: Solier	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: too clayey, wetness.
Ta: Tensas	Severe: wetness, percs slowly, flooding.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Te: Tensas	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Tn*:					
Tensas	Severe: wetness, percs slowly, flooding.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Tn*:					
Sharkey	Severe: wetness, percs slowly, flooding.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Ts*:					
Tensas	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
Vk: Vick	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
Wr: Wrightsville	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Bd------------------ Baldwin	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Ca------------------ Calhoun	Fair	Fair	Fair	Good	Good	Good	Good	Good	Fair	Good	Good
Cm------------------ Commerce	Good	Good	Good	Good	---	Good	Fair	Fair	Good	Good	Fair
Cn------------------ Convent	Good	Good	Good	Good	---	Good	Fair	Fair	Good	Good	Fair
Cu------------------ Convent	Fair	Good	Good	Good	---	Good	Fair	Fair	Good	Good	Fair
Cv------------------ Coteau	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Cw------------------ Crowley Variant	Fair	Fair	Fair	Good	---	Good	Fair	Fair	Fair	Fair	Good
Da------------------ Deerford	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Dd, De-------------- Dundee	Fair	Good	Good	Good	---	Good	Fair	Fair	Good	Good	Fair
Dn------------------ Dundee	Fair	Good	Good	Good	---	Good	Fair	Fair	Good	Good	Fair
Ds*:											
Dundee--------------	Fair	Good	Good	Good	---	Good	Fair	Fair	Good	Good	Fair
Sharkey-------------	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Dv------------------ Dundee Variant	Fair	Good	Good	Good	---	Good	Fair	Fair	Good	Good	Fair
Fa------------------ Fausse	Very poor.	Very poor.	Very poor.	Poor	---	Poor	Good	Good	Very poor.	Poor	Good
Ga, Go-------------- Gallion	Good	Good	Good	Good	---	Good	Poor	Very poor.	Good	Good	Very poor.
Gr------------------ Gore	Poor	Good	Good	---	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Gy------------------ Guyton	Poor	Fair	Fair	Fair	---	Fair	Good	Good	Poor	Fair	Good
Ko------------------ Kolin	Fair	Good	Good	---	Good	Good	Poor	Very poor.	Good	Good	Very poor.
La------------------ Latanier	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Ln------------------ Latanier	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Lo, Lr-------------- Loring	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Ma: McKamie	Poor	Fair	Good	---	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Me, Mh: Memphis	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Mm: Memphis	Poor	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Mo: Moreland	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Mr: Moreland	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Ms: Moreland	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Mt, Mu: Moreland	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Mw: Moreland	Poor	Fair	Fair	Good	---	Good	Good	Good	Poor	Fair	Good
Nd, No, Nr, Nw: Norwood	Good	Good	Good	Good	---	Good	Poor	Very poor.	Good	Good	Very poor.
Ra, Rn, Ro: Roxana	Good	Good	Good	Good	---	Good	Poor	Very poor.	Good	Good	Very poor.
Ru: Roxana	Good	Good	Good	Good	---	Good	Poor	Very poor.	Good	Good	Very poor.
Rx: Roxana	Poor	Fair	Fair	Good	---	Good	Poor	Very poor.	Fair	Good	Very poor.
Sa: Sharkey	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Se, Sh: Sharkey	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Sk: Sharkey	Poor	Fair	Fair	Good	---	Good	Good	Good	Poor	Fair	Good
So, Sr: Solier	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Ta: Tensas	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Te: Tensas	Fair	Fair	Fair	Good	---	Good	Good	Good	Poor	Good	Good
Tn*:											
Tensas	Fair	Fair	Fair	Good	---	Good	Fair	Fair	Fair	Good	Good
Sharkey	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Ts*:											
Tensas	Fair	Fair	Fair	Good	---	Good	Fair	Fair	Poor	Good	Good
Sharkey	Fair	Fair	Fair	Good	---	Good	Good	Good	Fair	Good	Good
Vk: Vick	Fair	Good	Good	Good	Fair	Good	Fair	Fair	Fair	Good	Fair

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Wr------------------ Wrightsville	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Bd-----------------Baldwin	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
Ca-----------------Calhoun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Cm-----------------Commerce	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Cn-----------------Convent	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Cu-----------------Convent	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
Cv-----------------Coteau	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Cw-----------------Crowley Variant	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.
Da-----------------Deerford	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: excess sodium, wetness.
Dd, De-------------Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Dn-----------------Dundee	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding, low strength.	Moderate: wetness, flooding.
Ds*:					
Dundee------------	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
Sharkey-----------	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Dv-----------------Dundee Variant	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Severe: too clayey.
Fa-----------------Fausse	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding, too clayey.
Ga, Go-------------Gallion	Slight------------	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
Gr-----------------Gore	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Gy: Guyton	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Ko: Kolin	Severe: wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
La: Latanier	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, shrink-swell, flooding.	Severe: too clayey.
Ln: Latanier	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell. flooding, shrink-swell.	Severe: too clayey.
Lo, Lr: Loring	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: low strength.	Slight.
Ma: McKamie	Severe: too clayey.	Severe: shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: slope.
Me, Mh: Memphis	Slight	Slight	Slight	Severe: low strength.	Slight.
Mm: Memphis	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
Mo: Moreland	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness.	Severe: wetness.
Mr: Moreland	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness.
Ms: Moreland	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Mt, Mu: Moreland	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, too clayey.
Mw: Moreland	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.
Nd: Norwood	Slight	Slight	Slight	Severe: low strength.	Slight.
No: Norwood	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
Nr: Norwood	Slight	Slight	Slight: flooding.	Severe: low strength.	Slight.
Nw: Norwood	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ra, Rn, Ro: Roxana	Severe: cutbanks cave.	Slight	Slight	Slight	Slight.
Ru: Roxana	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Rx: Roxana	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Sa: Sharkey	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Se, Sh: Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, too clayey.
Sk: Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.
So: Solier	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: too clayey, wetness.
Sr: Solier	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, low strength, wetness.	Severe: too clayey, wetness.
Ta: Tensas	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: low strength.	Severe: too clayey.
Te: Tensas	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: too clayey.
Tn*:					
Tensas	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: low strength.	Severe: too clayey.
Sharkey	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness.	Severe: wetness, too clayey.
Ts*:					
Tensas	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: too clayey.
Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, too clayey.
Vk: Vick	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength, shrink-swell.	Severe: wetness.
Wr: Wrightsville	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Bd------------------- Baldwin	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ca------------------- Calhoun	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Cm------------------- Commerce	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Cn------------------- Convent	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Cu------------------- Convent	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Cv------------------- Coteau	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Cw------------------- Crowley Variant	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Da------------------- Deerford	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, excess sodium.	Severe: wetness.	Poor: wetness, excess sodium.
Dd, De--------------- Dundee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Dn------------------- Dundee	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Ds*:					
Dundee---------------	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Sharkey--------------	Severe: wetness, percs slowly.	Severe: flooding.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Dv------------------- Dundee Variant	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Fa------------------- Fausse	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ga, Go Gallion	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
Gr Gore	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Gy Guyton	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ko Kolin	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
La Latanier	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ln Latanier	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Lo, Lr Loring	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
Ma McKamie	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
Me Memphis	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.
Mh Memphis	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Mm Memphis	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Mo Moreland	Severe: wetness, percs slowly.	Severe: flooding.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Mr Moreland	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Ms Moreland	Severe: wetness, percs slowly.	Severe: flooding.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Mt, Mu, Mw Moreland	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Nd Norwood	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Good.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
No------------------- Norwood	Severe: flooding.	Moderate: seepage.	Severe: flooding.	Severe: flooding.	Good.
Nr------------------- Norwood	Moderate: percs slowly.	Moderate: seepage.	Slight-----------	Slight-----------	Good.
Nw------------------- Norwood	Severe: flooding.	Moderate: seepage.	Severe: flooding.	Severe: flooding.	Good.
Ra------------------- Roxana	Moderate: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: wetness.	Good.
Rn, Ro--------------- Roxana	Moderate: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Good.
Ru, Rx--------------- Roxana	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
Sa------------------- Sharkey	Severe: wetness, percs slowly.	Severe: wetness. flooding.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Se, Sh, Sk----------- Sharkey	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
So------------------- Solier	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Sr------------------- Solier	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Ta------------------- Tensas	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Te------------------- Tensas	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Tn*:					
Tensas---------------	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Sharkey--------------	Severe: wetness, percs slowly.	Severe: wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Ts*:					
Tensas---------------	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ts*:					
Sharkey	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Vk: Vick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wr: Wrightsville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
Bd Baldwin	Slight	Severe: wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ca Calhoun	Slight	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
Cm Commerce	Moderate: seepage.	Severe: wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Cn Convent	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Cu Convent	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Cv Coteau	Slight	Moderate: piping, wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Cw Crowley Variant	Slight	Severe: wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Da Deerford	Slight	Severe: wetness, excess sodium.	Percs slowly, excess sodium.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, erodes easily.
Dd, De Dundee	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness.	Erodes easily, wetness.	Erodes easily.
Dn Dundee	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness.	Erodes easily, wetness.	Erodes easily.
Ds*:						
Dundee	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness.	Erodes easily, wetness.	Erodes easily.
Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Dv Dundee Variant	Moderate: seepage.	Severe: wetness, piping.	Favorable	Slow intake, percs slowly.	Wetness, percs slowly.	Percs slowly.
Fa Fausse	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly, flooding.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
Ga Gallion	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
Go Gallion	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable	Favorable	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Gr: Gore	Moderate: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Gy: Guyton	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ko: Kolin	Slight	Moderate: hard to pack, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness, percs slowly.	Erodes easily, percs slowly.
La: Latanier	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ln: Latanier	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Lo: Loring	Moderate: seepage.	Moderate: piping.	Favorable	Wetness, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth.
Lr: Loring	Moderate: seepage.	Moderate: piping.	Slope	Wetness, rooting depth, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
Ma: McKamie	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope, erodes easily, slow intake.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
Me: Memphis	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
Mh: Memphis	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
Mm: Memphis	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Mo: Moreland	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Mr: Moreland	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ms: Moreland	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Mt, Mu, Mw: Moreland	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Nd, No: Norwood	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
Nr, Nw: Norwood	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
Ra, Rn: Roxana	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
Ro: Roxana	Moderate: seepage.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ru, Rx: Roxana	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
Sa: Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Se, Sh, Sk: Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
So: Solier	Moderate: seepage.	Severe: wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Sr: Solier	Moderate: seepage.	Severe: wetness.	Flooding, percs slowly.	Flooding, wetness, slow intake.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ta: Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
Te: Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
Tn*:						
Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, slope.	Wetness, slow intake, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Ts*:						
Tensas	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding, slope.	Wetness, slow intake, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
Vk: Vick	Slight	Severe: wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, percs slowly, wetness.	Wetness, percs slowly, erodes easily.
Wr: Wrightsville	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Bd---------------- Baldwin	0-8	Silty clay loam	CL, CH	A-7-6, A-6	0	100	100	100	95-100	35-55	15-28
	8-29	Clay, silty clay	CH	A-7-6	0	95-100	95-100	95-100	90-100	51-75	25-45
	29-60	Silty clay, silty clay loam, loam.	CH, CL	A-7-6, A-6	0	95-100	95-100	95-100	90-100	35-65	15-35
Ca---------------- Calhoun	0-20	Silt loam--------	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	20-35	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	100	100	95-100	95-100	30-45	11-24
	35-76	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
Cm---------------- Commerce	0-12	Silt loam--------	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	12-22	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
	22-68	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
Cn---------------- Convent	0-10	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	95-100	85-100	<27	NP-7
	10-60	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	100	100	95-100	75-100	<27	NP-7
Cu---------------- Convent	0-11	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	95-100	85-100	<27	NP-7
	11-60	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	100	100	95-100	75-100	<27	NP-7
Cv---------------- Coteau	0-6	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	95-100	<27	NP-7
	6-37	Silty clay loam, silt loam.	CL	A-6	0	100	100	100	95-100	33-40	12-18
	37-60	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-37	5-15
Cw---------------- Crowley Variant	0-16	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	90-100	<27	NP-7
	16-47	Silty clay, clay	CH	A-7-6	0	100	100	95-100	85-100	41-65	20-40
	47-96	Silty clay, clay, silty clay loam.	CH	A-7-6, A-6	0	100	100	95-100	85-100	38-65	18-40
Da---------------- Deerford	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	100	100	95-100	<28	NP-7
	7-55	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	100	100	100	95-100	32-49	11-25
	55-93	Loam, sandy clay loam.	CL, SM-SC, SC	A-6, A-4, A-7-6	0	100	100	80-100	50-95	25-49	5-25
Dd---------------- Dundee	0-6	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	3-11
	6-45	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	45-63	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
De---------------- Dundee	0-7	Silty clay loam	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	3-11
	7-32	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	32-60	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
Dn---------------- Dundee	0-8	Silty clay loam	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	3-11
	8-35	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	35-65	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Ds*:											
Dundee----------	0-8	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	3-11
	8-48	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	48-60	Very fine, sandy loam, silt loam, clay loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
Sharkey---------	0-9	Clay-------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	9-60	Clay, silty clay.	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
Dv--------------- Dundee Variant	0-7	Clay-------------	CH	A-7	0	100	100	100	95-100	51-75	26-45
	7-14	Silty clay loam, silt loam.	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	3-11
	14-30	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	30-52	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
	52-72	Loam, very fine sandy loam, silty clay.	CL, ML, CH	A-4, A-7	0	100	100	85-100	60-95	20-60	NP-45
Fa--------------- Fausse	0-13	Clay-------------	CH, OH, MH	A-7-6, A-7-5	0	100	100	100	95-100	50-100	21-71
	13-37	Clay-------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	60-100	31-71
	37-66	Clay, silty clay, silty clay loam.	CH, MH, CL, ML	A-7-6, A-7-5	0	100	100	100	95-100	45-100	16-71
Ga--------------- Gallion	0-8	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	100	100	90-100	<28	NP-11
	8-37	Silt loam, silty clay loam, clay loam.	CL	A-6	0	100	100	100	90-100	28-40	11-17
	37-66	Stratified silty clay loam to very fine sandy loam.	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	23-34	4-12
Go--------------- Gallion	0-6	Silty clay loam	CL	A-6	0	100	100	100	90-100	33-40	15-20
	6-54	Silt loam, silty clay loam, clay loam.	CL	A-6	0	100	100	100	90-100	28-40	11-17
	54-60	Stratified silty clay loam to very fine sandy loam.	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	23-34	4-12
Gr--------------- Gore	0-7	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	60-90	<27	NP-7
	7-47	Clay, silty clay	CH	A-7-6, A-7-5	0	100	100	95-100	85-100	53-65	28-40
	47-66	Clay-------------	CH	A-7-6, A-7-5	0	100	100	95-100	85-100	51-83	25-53
Gy--------------- Guyton	0-29	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-90	<27	NP-7
	29-54	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0	100	100	94-100	75-95	22-40	6-18
	54-63	Silt loam, silty clay loam, clay loam.	CL, CL-ML, ML	A-6, A-4	0	100	100	95-100	51-95	<40	NP-18
Ko--------------- Kolin	0-4	Silt loam--------	ML, CL-ML	A-4	0	100	100	85-100	60-85	<27	NP-7
	4-27	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	85-95	30-40	11-18
	27-60	Clay, silty clay	CH	A-7-6	0	100	100	90-100	75-95	50-63	25-35

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
La---------------- Latanier	0-5	Clay--------------	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	5-27	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	27-60	Silt loam, silty clay loam, very fine sandy loam.	CL-ML, CL, ML	A-4, A-6	0	100	100	100	80-100	<40	NP-17
Ln---------------- Latanier	0-6	Clay--------------	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	6-27	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	27-60	Silt loam, silty clay loam, very fine sandy loam.	CL-ML, CL, ML	A-4, A-6	0	100	100	100	80-100	<40	NP-17
Lo---------------- Loring	0-6	Silt loam---------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	<35	NP-15
	6-25	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	0	100	100	95-100	90-100	32-48	8-20
	25-61	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-22
Lr---------------- Loring	0-6	Silt loam---------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	<35	NP-15
	6-19	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	0	100	100	95-100	90-100	32-48	8-20
	19-57	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-22
	57-65	Silt loam---------	CL, ML	A-4, A-6, A-7	0	100	100	95-100	70-100	28-45	7-20
Ma---------------- McKamie	0-6	Silt loam---------	CL, CL-ML	A-6, A-4	0	100	100	95-100	80-100	20-40	5-22
	6-38	Clay, silty clay	CH, CL	A-7-6	0	100	100	95-100	80-100	45-70	22-40
	38-71	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-4, A-6	0	100	100	95-100	50-95	20-40	5-22
Me---------------- Memphis	0-6	Silt loam---------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	6-22	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	22-68	Silt loam---------	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
Mh---------------- Memphis	0-6	Silt loam---------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	6-26	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	26-72	Silt loam---------	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
Mm---------------- Memphis	0-5	Silt loam---------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	5-28	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
	28-60	Silt loam---------	ML, CL	A-4, A-6	0	100	100	100	90-100	30-40	6-15
Mo---------------- Moreland	0-10	Silt loam---------	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	18-31	3-13
	10-60	Clay, silty clay	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
Mr---------------- Moreland	0-10	Silt loam---------	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	18-31	3-13
	10-60	Clay, silty clay	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
Ms, Mt------------ Moreland	0-13	Clay--------------	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
	13-60	Clay, silty clay	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
Mu---------------- Moreland	0-13	Clay--------------	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
	13-60	Clay, silty clay	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
Mw---------------- Moreland	0-12	Clay--------------	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45
	12-60	Clay, silty clay	CH	A-7-6	0	100	95-100	90-100	90-100	51-74	25-45

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Nd------ Norwood	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	51-90	20-35	4-15
	9-16	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	90-100	60-98	25-46	7-26
	16-80	Silt loam, very fine sandy loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-98	20-45	2-25
No------ Norwood	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	51-90	20-35	4-15
	6-33	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	90-100	60-98	25-46	7-26
	33-60	Silt loam, very fine sandy loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-98	20-45	2-25
Nr------ Norwood	0-4	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-98	30-55	15-35
	4-16	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	90-100	60-98	25-46	7-26
	16-75	Silt loam, very fine sandy loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-98	20-45	2-25
Nw------ Norwood	0-6	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-98	30-55	15-35
	6-17	Silt loam, silty clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	90-100	60-98	25-46	7-26
	17-60	Silt loam, very fine sandy loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	100	100	90-100	70-98	20-45	2-25
Ra------ Roxana	0-5	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-75	<27	NP-7
	5-62	Silt loam, very fine sandy loam, loamy very fine sand.	ML, CL-ML	A-4	0	100	100	85-100	50-85	<27	NP-7
Rn------ Roxana	0-5	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-75	<27	NP-7
	5-40	Silt loam, very fine sandy loam, loamy very fine sand.	ML, CL-ML	A-4	0	100	100	85-100	50-85	<27	NP-7
	40-62	Variable---------	---	---	---	---	---	---	---	---	---
Ro------ Roxana	0-6	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-75	<27	NP-7
	6-63	Silt loam, very fine sandy loam, loamy very fine sand.	ML, CL-ML	A-4	0	100	100	85-100	50-85	<27	NP-7
Ru------ Roxana	0-6	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-75	<27	NP-7
	6-64	Silt loam, very fine sandy loam, loamy very fine sand.	ML, CL-ML	A-4	0	100	100	85-100	50-85	<27	NP-7
Rx------ Roxana	0-6	Very fine sandy loam.	ML, CL-ML	A-4	0	100	100	85-100	50-75	<27	NP-7
	6-60	Silt loam, very fine sandy loam, loamy very fine sand.	ML, CL-ML	A-4	0	100	100	85-100	50-85	<27	NP-7

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Sa------------- Sharkey	0-6	Clay------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	6-35	Clay------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	35-60	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Se------------- Sharkey	0-12	Clay------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	12-46	Clay------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	46-66	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Sh------------- Sharkey	0-6	Clay------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	6-42	Clay------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	42-80	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Sk------------- Sharkey	0-11	Clay------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	11-39	Clay------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	39-64	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
So------------- Solier	0-6	Clay------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	51-75	26-46
	6-19	Clay, silty clay	CH	A-7-6, A-7-5	0	100	100	100	95-100	51-75	26-46
	19-25	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	95-100	90-100	23-31	3-10
	25-60	Silty clay loam, silt loam.	CL	A-6, A-7-6	0	100	100	95-100	90-100	32-45	11-22
	60-84	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	95-100	90-100	32-45	11-22
Sr------------- Solier	0-5	Clay------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	51-75	26-46
	5-13	Clay, silty clay	CH	A-7-6, A-7-5	0	100	100	100	95-100	51-75	26-46
	13-24	Silt loam--------	ML, CL, CL-ML	A-4	0	100	100	95-100	90-100	23-31	3-10
	24-60	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	95-100	90-100	32-45	11-22
Ta------------- Tensas	0-8	Silty clay-------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	8-33	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	33-60	Very fine sandy loam, silty clay loam, loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17
Te------------- Tensas	0-4	Silty clay-------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	4-27	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	27-60	Very fine sandy loam, silty clay loam, silt loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17
Tn*: Tensas----------	0-5	Silty clay-------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	5-25	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	25-60	Very fine sandy loam, silty clay loam, loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Tn*:											
Sharkey----------	0-8	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	8-47	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	47-60	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Ts*:											
Tensas-----------	0-4	Silty clay--------	CH, CL	A-7-6	0	100	100	100	95-100	46-70	22-40
	4-28	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45
	28-60	Very fine sandy loam, silty clay loam, loam.	CL-ML, CL	A-4, A-6	0	100	100	100	80-100	25-40	5-17
Sharkey----------	0-10	Clay--------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	10-48	Clay--------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	48-60	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
Vk---------------- Vick	0-7	Silt loam---------	ML, CL-ML	A-4	0	100	100	95-100	90-100	<27	NP-7
	7-25	Silt loam, silty clay loam.	CL	A-6, A-7-6	0	100	100	95-100	90-100	32-45	11-22
	25-45	Clay, silty clay, silty clay loam.	CH, CL	A-7-6	0	100	100	95-100	95-100	41-60	20-35
	45-63	Silt loam, loam, silty clay loam.	CL, CL-ML, ML	A-6, A-4, A-7-6	0	100	100	90-100	85-100	25-45	3-20
Wr---------------- Wrightsville	0-15	Silt loam---------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	75-100	<31	NP-10
	15-68	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	41-65	22-40

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surfer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH	Mmhos/cm				Pct
Bd---------------- Baldwin	0-8	27-39	1.35-1.65	0.06-0.2	0.18-0.22	4.5-6.5	<2	Moderate	0.37	5	.5-4
	8-29	40-55	1.20-1.60	<0.06	0.12-0.18	5.6-7.8	<2	Very high	0.32		
	29-60	25-55	1.20-1.65	<0.2	0.12-0.21	6.1-8.4	<2	High------	0.32		
Ca---------------- Calhoun	0-20	10-27	1.30-1.65	0.2-0.6	0.21-0.23	4.5-7.3	<2	Low-------	0.49	5	.5-2
	20-42	10-35	1.30-1.70	0.06-0.2	0.20-0.22	4.5-5.5	<2	Moderate	0.43		
	35-76	10-27	1.40-1.70	0.2-0.6	0.21-0.23	4.5-7.8	<2	Low-------	0.43		
Cm---------------- Commerce	0-12	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-7.8	<2	Low-------	0.43	5	.5-2
	12-22	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	<2	Moderate	0.32		
	22-68	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	<2	Low-------	0.37		
Cn---------------- Convent	0-10	0-18	1.30-1.65	0.6-2.0	0.18-0.23	5.6-8.4	<2	Low-------	0.43	5	.5-2
	10-60	0-18	1.30-1.65	0.6-2.0	0.20-0.23	6.1-8.4	<2	Low-------	0.43		
Cu---------------- Convent	0-11	0-18	1.30-1.65	0.6-2.0	0.18-0.23	5.6-8.4	<2	Low-------	0.37	5	.5-2
	11-60	0-18	1.30-1.65	0.6-2.0	0.20-0.23	6.1-8.4	<2	Low-------	0.37		
Cv---------------- Coteau	0-6	5-18	1.35-1.65	0.2-0.6	0.21-0.23	5.1-6.5	<2	Low-------	0.37	5	.5-2
	6-37	18-32	1.35-1.65	0.2-0.6	0.20-0.23	5.1-6.5	<2	Moderate	0.32		
	37-60	8-27	1.35-1.65	0.2-0.6	0.20-0.23	5.1-7.3	<2	Low-------	0.37		
Cw---------------- Crowley Variant	0-16	8-20	1.35-1.65	0.6-2.0	0.21-0.23	4.5-5.5	<2	Low-------	0.43	5	.5-2
	16-47	45-60	1.20-1.55	<0.06	0.14-0.18	5.1-7.3	<2	Very high	0.32		
	47-96	30-60	1.20-1.65	0.06-0.2	0.14-0.20	6.1-8.4	<2	High------	0.32		
Da---------------- Deerford	0-7	5-27	1.30-1.70	0.6-2.0	0.21-0.23	4.5-6.5	<2	Low-------	0.49	3	.5-4
	7-55	10-35	1.30-1.80	0.06-0.2	0.12-0.18	5.1-8.4	<2	Moderate	0.49		
	55-93	10-35	1.30-1.80	0.2-0.6	0.12-0.18	6.6-8.4	<2	Moderate	0.49		
Dd---------------- Dundee	0-6	10-30	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.5	<2	Low-------	0.43	5	.5-2
	6-46	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	<2	Moderate	0.32		
	46-60	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	<2	Low-------	0.32		
De---------------- Dundee	0-7	10-30	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.0	<2	Low-------	0.37	5	.5-2
	7-32	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	<2	Moderate	0.32		
	32-60	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	<2	Low-------	0.32		
Dn---------------- Dundee	0-8	10-30	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.5	<2	Low-------	0.37	5	.5-2
	8-35	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	<2	Moderate	0.32		
	35-65	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	<2	Low-------	0.32		
Ds*:											
Dundee-----------	0-8	10-30	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.5	<2	Low-------	0.43	5	.5-2
	8-48	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	<2	Moderate	0.32		
	48-60	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	<2	Low-------	0.32		
Sharkey----------	0-9	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	<2	Very high	0.32	5	.5-2
	9-60	60-90	1.20-1.50	<0.06	0.12-0.20	5.6-8.4	<2	Very high	0.28		
Dv---------------- Dundee Variant	0-7	40-60	1.20-1.50	<0.06	0.12-0.18	6.1-7.8	<2	Very high	0.32	5	.5-4
	7-14	10-30	1.30-1.80	0.2-2.0	0.12-0.18	5.6-7.8	<2	Moderate	0.37		
	14-30	18-34	1.30-1.80	0.2-0.6	0.18-0.20	5.6-7.8	<2	Moderate	0.32		
	30-52	18-25	1.30-1.80	0.6-2.0	0.18-0.20	5.6-7.8	<2	Low-------	0.37		
	52-72	18-60	1.30-1.80	0.06-2.0	0.12-0.18	6.1-7.8	<2	High------	0.32		
Fa---------------- Fausse	0-13	40-95	0.8-1.45	<0.06	0.18-0.20	5.6-7.3	<2	Very high	0.20	5	2-15
	13-37	60-95	1.10-1.45	<0.06	0.18-0.20	6.1-8.4	<2	Very high	0.24		
	37-66	35-95	1.10-1.45	<0.2	0.18-0.22	6.6-8.4	<2	Very high	0.24		
Ga---------------- Gallion	0-8	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-7.3	<2	Low-------	0.43	5	.5-2
	8-37	14-35	1.35-1.75	0.6-2.0	0.20-0.22	5.6-7.8	<2	Moderate	0.32		
	37-66	14-35	1.35-1.75	0.6-2.0	0.20-0.23	6.1-8.4	<2	Low-------	0.37		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH	Mmhos/cm				Pct
Go----------------- Gallion	0-6	27-35	1.35-1.65	0.6-2.0	0.20-0.22	5.6-7.3	<2	Moderate	0.37	5	.5-2
	6-54	14-35	1.35-1.75	0.6-2.0	0.20-0.22	5.6-7.8	<2	Moderate	0.32		
	54-60	14-35	1.35-1.75	0.6-2.0	0.20-0.23	6.1-8.4	<2	Low--------	0.37		
Gr----------------- Gore	0-7	5-15	1.30-1.50	0.6-2.0	0.20-0.22	5.1-6.0	<2	Low--------	0.49	5	.5-2
	7-47	40-60	1.30-1.75	<0.06	0.14-0.18	4.5-7.3	<2	High-------	0.32		
	47-66	40-80	1.30-1.75	<0.06	0.14-0.18	5.6-7.8	<2	High-------	0.32		
Gy----------------- Guyton	0-29	7-25	1.35-1.65	0.6-2.0	0.20-0.23	3.6-6.0	<2	Low--------	0.43	5	.5-2
	29-54	20-35	1.35-1.70	0.06-0.2	0.15-0.22	3.6-6.0	<2	Low--------	0.37		
	54-63	20-35	1.35-1.70	0.06-2.0	0.15-0.22	3.6-8.4	<2	Low--------	0.37		
Ko----------------- Kolin	0-4	10-27	1.35-1.65	0.6-2.0	0.18-0.22	5.1-6.5	<2	Low--------	0.49	5	.5-2
	4-27	20-35	1.35-1.65	0.2-0.6	0.12-0.18	4.5-6.0	<2	Moderate	0.37		
	27-60	40-55	1.20-1.65	<0.06	0.15-0.18	4.5-6.5	<2	High-------	0.32		
La----------------- Latanier	0-5	40-55	1.20-1.70	<0.06	0.12-0.18	6.6-8.4	<2	Very high	0.32	5	.1-4
	5-27	40-55	1.20-1.70	<0.06	0.12-0.18	6.6-8.4	<2	Very high	0.32		
	27-60	10-27	1.30-1.65	0.06-2.0	0.12-0.22	6.6-8.4	<2	Low--------	0.37		
Ln----------------- Latanier	0-6	40-55	1.20-1.70	<0.06	0.12-0.18	6.6-8.4	<2	Very high	0.32	5	1-4
	6-27	40-55	1.20-1.70	<0.06	0.12-0.18	6.6-8.4	<2	Very high	0.32		
	27-60	10-27	1.30-1.65	0.06-2.0	0.18-0.22	6.6-8.4	<2	Low--------	0.37		
Lo----------------- Loring	0-6	8-18	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.49	3	.5-2
	6-25	18-35	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.43		
	25-61	12-25	1.50-1.70	0.06-0.2	0.06-0.13	4.5-6.0	<2	Low--------	0.43		
Lr----------------- Loring	0-6	8-18	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.49	3	.5-2
	6-19	18-35	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.43		
	19-57	12-25	1.50-1.70	0.06-0.2	0.06-0.13	4.5-6.0	<2	Low--------	0.43		
	57-65	10-25	1.30-1.60	0.2-2.0	0.06-0.13	4.5-6.5	<2	Low--------	0.43		
Ma----------------- McKamie	0-6	18-35	1.42-1.76	0.6-2.0	0.16-0.22	5.1-6.5	<2	Moderate	0.37	5	.5-2
	6-38	35-60	1.20-1.45	<0.06	0.12-0.18	4.5-6.0	<2	High-------	0.32		
	38-71	14-35	1.40-1.76	0.2-2.0	0.14-0.22	4.5-8.4	<2	Moderate	0.37		
Me----------------- Memphis	0-6	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.49	5	1-2
	6-22	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.37		
	22-68	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.37		
Mh----------------- Memphis	0-6	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.49	5	1-2
	6-26	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.37		
	26-72	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.37		
Mm----------------- Memphis	0-5	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.49	5	1-2
	5-28	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	<2	Low--------	0.37		
	28-60	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	<2	Low--------	0.37		
Mo----------------- Moreland	0-10	18-27	1.40-1.65	0.6-2.0	0.21-0.23	6.1-7.8	<2	Low--------	0.43	5	1-4
	10-60	39-60	1.20-1.45	<0.06	0.12-0.18	6.6-8.4	<2	Very high-	0.32		
Mr----------------- Moreland	0-10	18-27	1.40-1.65	0.6-2.0	0.21-0.23	6.1-7.8	<2	Low--------	0.43	5	1-4
	10-60	39-60	1.20-1.45	<0.06	0.12-0.18	6.6-8.4	<2	High-------	0.32		
Ms, Mt------------- Moreland	0-13	39-50	1.20-1.50	<0.06	0.12-0.18	6.1-7.8	<2	Very high	0.32	5	1-4
	13-60	39-60	1.20-1.45	<0.06	0.12-0.18	High 8.4	<2	Very High	0.32		
Mu----------------- Moreland	0-13	39-50	1.20-1.50	<0.06	0.12-0.18	6.1-7.8	<2	Very high	0.32	5	1-4
	13-60	39-60	1.20-1.45	<0.06	0.12-0.18	6.6-8.4	<2	Very high	0.32		
Mw----------------- Moreland	0-12	39-50	1.20-1.50	<0.06	0.12-0.18	6.1-7.8	<2	Very high	0.32	5	1-4
	12-60	39-60	1.20-1.45	<0.06	0.12-0.18	6.6-8.4	<2	High-------	0.32		
Nd----------------- Norwood	0-9	10-27	1.35-1.65	0.6-2.0	0.17-0.21	7.4-8.4	<2	Low--------	0.43	5	.5-2
	9-16	18-35	1.35-1.65	0.6-2.0	0.15-0.22	7.9-8.4	<2	Low--------	0.43		
	16-80	10-35	1.35-1.65	0.6-2.0	0.15-0.22	7.9-8.4	<2	Low--------	0.43		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS-Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH	Mmhos/cm				Pct
No----------------- Norwood	0-6	10-27	1.35-1.65	0.6-2.0	0.17-0.21	7.4-8.4	<2	Low--------	0.43	5	.5-2
	6-33	18-35	1.35-1.65	0.6-2.0	0.15-0.22	7.9-8.4	<2	Low--------	0.43		
	33-60	10-35	1.35-1.65	0.6-2.0	0.15-0.22	7.9-8.4	<2	Low--------	0.43		
Nr----------------- Norwood	0-4	27-40	1.35-1.65	0.6-2.0	0.18-0.22	7.4-8.4	<2	Moderate	0.37	5	.5-2
	4-16	18-35	1.35-1.65	0.6-2.0	0.15-0.22	7.9-8.4	<2	Low--------	0.43		
	16-75	10-35	---	0.6-2.0	0.15-0.22	7.9-8.4	<2	Low--------	0.43		
Nw----------------- Norwood	0-6	27-40	1.35-1.65	0.6-2.0	0.18-0.22	7.4-8.4	<2	Moderate	0.37	5	.5-2
	6-17	18-35	1.35-1.65	0.6-2.0	0.15-0.22	7.9-8.4	<2	Low--------	0.43		
	17-60	10-35	1.35-1.65	0.6-2.0	0.15-0.22	7.9-8.4	<2	Low--------	0.43		
Ra----------------- Roxana	0-5	5-27	1.35-1.80	0.6-2.0	0.10-0.21	6.1-8.4	<2	Low--------	0.43	5	.5-2
	5-62	10-18	1.35-1.80	0.6-2.0	0.10-0.19	6.6-8.4	<2	Low--------	0.37		
Rn----------------- Roxana	0-5	5-27	1.35-1.80	0.6-2.0	0.10-0.21	6.1-8.4	<2	Low--------	0.43	5	.5-2
	5-40	10-18	1.35-1.80	0.6-2.0	0.10-0.19	6.6-8.4	<2	Low--------	0.37		
	40-62	---	---	---	---	---	---	-----------	----		
Ro----------------- Roxana	0-6	5-27	1.35-1.80	0.6-2.0	0.10-0.21	6.1-8.4	<2	Low--------	0.43	5	.5-2
	6-63	10-18	1.35-1.80	0.6-2.0	0.10-0.19	6.6-8.4	<2	Low--------	0.37		
Ru----------------- Roxana	0-6	5-27	1.35-1.80	0.6-2.0	0.10-0.21	6.1-8.4	<2	Low--------	0.43	5	.5-2
	6-64	10-18	1.35-1.80	0.6-2.0	0.10-0.19	6.6-8.4	<2	Low--------	0.37		
Rx----------------- Roxana	0-12	5-27	1.35-1.80	0.6-2.0	0.10-0.21	6.1-8.4	<2	Low--------	0.43	5	.5-2
	12-60	10-18	1.35-1.80	0.6-2.0	0.10-0.19	6.6-8.4	<2	Low--------	0.37		
Sa----------------- Sharkey	0-6	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	<2	Very high	0.32	5	.5-4
	6-35	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	<2	Very high	0.28		
	35-60	25-90	1.20-1.75	0.06-0.2	0.12-0.22	6.6-8.4	<2	High-------	0.28		
Se----------------- Sharkey	0-12	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	<2	Very high	0.32	5	.5-4
	12-46	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	<2	Very high	0.28		
	46-66	25-90	1.20-1.75	0.06-0.2	0.12-0.22	6.6-8.4	<2	High-------	0.28		
Sh----------------- Sharkey	0-6	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	<2	Very high	0.32	5	.5-4
	6-42	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	<2	Very high	0.28		
	42-80	25-90	1.20-1.75	0.06-0.2	0.12-0.22	6.6-8.4	<2	High-------	0.28		
Sk----------------- Sharkey	0-11	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	<2	Very high	0.32	5	.5-4
	11-39	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	<2	Very high	0.28		
	39-64	25-90	1.20-1.75	0.06-0.2	0.12-0.22	6.6-8.4	<2	High-------	0.28		
So----------------- Solier	0-6	40-60	1.20-1.50	<0.06	0.18-0.20	6.1-7.8	<2	Very high	0.32	5	---
	6-19	40-60	1.20-1.50	<0.06	0.14-0.20	6.1-7.8	<2	Very high	0.32		
	19-25	8-25	1.35-1.65	0.6-2.0	0.15-0.22	6.6-8.4	<2	Low--------	0.43		
	25-60	18-35	1.35-1.65	0.06-0.2	0.15-0.22	6.6-8.4	<2	Moderate	0.37		
	60-84	18-38	1.35-1.65	0.2-0.6	0.15-0.22	6.6-8.4	<2	Moderate	0.37		
Sr----------------- Solier	0-5	40-60	1.20-1.50	<0.06	0.18-0.20	6.1-7.8	<2	Very high	0.32	5	.5-4
	5-13	40-60	1.20-1.50	<0.06	0.14-0.20	6.1-7.8	<2	Very high	0.32		
	13-24	8-25	1.35-1.65	0.6-2.0	0.15-0.22	6.6-8.4	<2	Low--------	0.43		
	24-60	18-38	1.35-1.65	0.2-0.6	0.15-0.22	6.6-8.4	<2	Moderate	0.37		
Ta----------------- Tensas	0-8	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	<2	High-------	0.32	5	.5-4
	8-33	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	<2	Very high	0.32		
	33-60	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	<2	Low--------	0.37		
Te----------------- Tensas	0-4	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	<2	High-------	0.32	5	.5-4
	4-27	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	<2	Very high	0.32		
	27-60	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	<2	Low--------	0.37		
Tn*:											
Tensas------------	0-5	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	<2	High-------	0.32	5	.5-4
	5-25	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	<2	Very high	0.32		
	25-60	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	<2	Low--------	0.37		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS-Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH	Mmhos/cm				Pct
Tn*:											
Sharkey	0-8	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	<2	Very high	0.32	5	.5-4
	8-47	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	<2	Very high	0.28		
	47-60	25-90	1.20-1.75	0.06-0.2	0.12-0.22	6.6-8.4	<2	High	0.28		
Ts*:											
Tensas	0-4	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	<2	High	0.32	4	.5-2
	4-28	40-60	1.20-1.50	<0.06	0.12-0.18	4.5-6.0	<2	Very high	0.32		
	28-60	10-39	1.30-1.80	0.2-2.0	0.20-0.23	5.1-6.5	<2	Low	0.37		
Sharkey	0-10	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	<2	Very high	0.32	5	.5-4
	10-48	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	<2	Very high	0.28		
	48-60	25-90	1.20-1.75	0.06-0.2	0.12-0.22	6.6-8.4	<2	High	0.28		
Vk: Vick	0-7	8-20	1.35-1.65	0.6-2.0	0.21-0.23	4.5-6.0	<2	Low	0.49	5	.5-2
	7-25	15-35	1.35-1.65	0.2-0.6	0.15-0.20	4.5-6.0	<2	Low	0.43		
	25-45	35-55	1.20-1.60	0.06-0.2	0.15-0.18	4.5-6.0	<2	High	0.32		
	45-63	15-35	1.35-1.65	0.2-0.6	0.15-0.20	5.1-7.3	<2	Low	0.37		
Wr: Wrightsville	0-15	10-25	1.25-1.50	0.2-0.6	0.16-0.24	3.6-5.5	<2	Low	0.49	5	.5-2
	15-68	35-55	1.20-1.45	<0.06	0.14-0.22	3.6-6.0	<2	High	0.37		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
Bd------ Baldwin	D	None------	---	---	0-2.0	Apparent	Dec-Apr
Ca------ Calhoun	D	None------	---	---	0-2.0	Perched	Dec-Apr
Cm------ Commerce	C	None------	---	---	1.5-4.0	Apparent	Dec-Apr
Cn------ Convent	C	None------	---	---	1.5-4.0	Apparent	Dec-Apr
Cu------ Convent	C	Occasional------	Brief to long	Dec-Jul	1.5-4.0	Apparent	Dec-Apr
Cv------ Coteau	C	None------	---	---	1.5-3.0	Perched	Dec-Apr
Cw------ Crowley Variant	D	None------	---	---	0.5-1.5	Perched	Dec-Apr
Da------ Deerford	D	None------	---	---	0.5-1.5	Perched	Dec-Apr
Dd, De------ Dundee	C	None------	---	---	1.5-3.5	Apparent	Jan-Apr
Dn------ Dundee	C	Occasional------	Long to very long.	Dec-Jun	1.5-3.5	Apparent	Jan-Apr
Ds*:							
Dundee------	C	None------	---	---	1.5-3.5	Apparent	Jan-Apr
Sharkey------	D	Rare------	---	---	0-2.0	Apparent	Dec-Apr
Dv------ Dundee Variant	C	None------	---	---	1.5-3.5	Apparent	Jan-Apr
Fa------ Fausse	D	Frequent------	Brief to long	Jan-Dec	+1.0-1.5	Apparent	Jan-Dec
Ga, Go------ Gallion	B	None------	---	---	>6.0	---	---
Gr------ Gore	D	None------	---	---	>6.0	---	---
Gy------ Guyton	D	Frequent------	Very brief to long.	Jan-Dec	0-1.5	Perched	Dec-May
Ko------ Kolin	C	None------	---	---	1.5-3.0	Perched	Dec-Apr
La------ Latanier	D	Rare------	---	---	1.0-3.0	Apparent	Dec-Apr
Ln------ Latanier	D	Occasional------	Brief------	Nov-Jul	1.0-3.0	Apparent	Dec-Apr
Lo, Lr------ Loring	C	None------	---	---	2.0-3.0	Perched	Dec-Mar

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
Ma----------------------- McKamie	D	None------------	---	---	>6.0	---	---
Me, Mh, Mm-------------- Memphis	B	None------------	---	---	>6.0	---	---
Mo----------------------- Moreland	D	Rare------------	=--	---	0-1.5	Perched	Dec-Apr
Mr----------------------- Moreland	D	Occasional------	Brief to long	Dec-Jun	0-1.5	Perched	Dec-Apr
Ms----------------------- Moreland	D	Rare------------	---	---	0-1.5	Perched	Dec-Apr
Mt, Mu------------------ Moreland	D	Occasional------	Brief to long	Dec-Jun	0-1.5	Perched	Dec-Apr
Mw----------------------- Moreland	D	Frequent--------	Brief to long	Dec-Jun	0-1.5	Perched	Dec-Apr
Nd----------------------- Norwood	B	None------------	---	---	>6.0	---	---
No----------------------- Norwood	B	Occasional------	Brief to long	Dec-Jun	>6.0	---	---
Nr----------------------- Norwood	B	None------------	---	---	>6.0	---	---
Nw----------------------- Norwood	B	Occasional------	Brief to long	Dec-Jun	>6.0	---	---
Ra, Rn, Ro-------------- Roxana	B	None------------	---	---	4.0-6.0	Apparent	Dec-Apr
Ru----------------------- Roxana	B	Occasional------	Brief to long	Dec-Jun	4.0-6.0	Apparent	Dec-Apr
Rx----------------------- Roxana	B	Frequent--------	Brief to long	Dec-Jun	4.0-6.0	Apparent	Dec-Apr
Sa----------------------- Sharkey	D	Rare------------	---	---	0-2.0	Apparent	Dec-Apr
Se, Sh------------------ Sharkey	D	Occasional------	Brief to very long.	Dec-Jun	0-2.0	Apparent	Dec-Apr
Sk----------------------- Sharkey	D	Frequent--------	Brief to very long.	Dec-Jun	0-2.0	Apparent	Dec-Apr
So----------------------- Solier	D	Rare------------	---	---	0-1.5	Perched	Dec-Apr
Sr----------------------- Solier	D	Occasional------	Long----------	Dec-Jun	0-1.5	Perched	Dec-Apr
Ta----------------------- Tensas	D	Rare------------	---	---	1.0-3.0	Apparent	Dec-Apr
Te----------------------- Tensas	D	Occasional------	Brief to long	Dec-Jun	1.0-3.0	Apparent	Dec-Apr
Tn*:							
Tensas------------------	D	Rare------------	---	---	1.0-3.0	Apparent	Dec-Apr
Sharkey-----------------	D	Rare------------	---	---	0-2.0	Apparent	Dec-Apr

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
Ts*:							
Tensas	D	Occasional	Brief to long	Dec-Jun	1.0-3.0	Apparent	Dec-Apr
Sharkey	D	Occasional	Brief to very long.	Dec-Jun	0-2.0	Apparent	Dec-Apr
Vk: Vick	C	None	---	---	0.5-2.0	Apparent	Dec-Apr
Wr: Wrightsville	D	None	---	---	0.5-1.5	Perched	Dec-Apr

*See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CHEMICAL TEST DATA FOR SELECTED SOILS

[Analysis by Soils Laboratory of the Louisiana Agricultural Experiment Station]

Soil sample and number	Depth from surface	Horizon	pH	Organic matter	Available P	Exchangeable cations: Ca	Mg	K	Na	Al	H	Exch. acidity	C.E.C.*	Saturation: Base	Al	Na	Ca/Mg ratio
	In			Pct	Ppm	----------Meq/100g-------							Sum	Pct	Pct	Pct	
Baldwin silty clay loam: (S79LA-9-1)	0-8	A1	6.1	2.69	28	19.8	6.9	0.7	0.1	0.0	0.0	8.8	36.3	76	0.0	0.3	2.9
	8-18	B21tg	6.3	0.91	9	20.0	8.1	0.3	0.3	0.0	0.0	6.9	35.8	81	0.0	0.8	2.5
	18-29	B22tg	7.8	0.43	24	20.0	8.1	0.6	0.6	0.0	0.0	6.4	35.6	82	0.0	1.7	2.5
	29-40	B3tg	7.6	0.29	140	19.5	8.1	0.4	0.4	0.0	0.0	3.9	32.3	88	0.0	1.2	2.4
	40-60	IICg	7.2	0.19	219	12.5	5.5	0.2	0.2	0.0	0.0	2.5	20.9	88	0.0	1.0	2.3
Calhoun silt loam: (S79LA-9-2)	0-5	Ap	6.8	0.87	105	6.9	0.4	0.1	0.1	0.0	0.1	2.0	9.5	79	0.0	1.0	17.2
	5-12	A21g	6.8	0.39	56	6.1	0.9	0.1	0.1	0.0	0.0	3.0	10.2	70	0.0	1.0	6.8
	12-20	A22g	5.8	0.34	97	5.5	1.7	0.1	0.1	0.2	0.2	4.9	12.3	60	2.6	0.8	3.2
	20-35	B2tg	5.5	0.24	54	6.2	2.7	0.2	0.2	0.7	0.4	6.4	15.7	59	6.7	1.3	2.3
	35-55	B3g	5.7	0.19	58	6.5	2.8	0.2	0.2	0.4	0.3	5.9	15.6	62	3.8	1.3	2.3
	55-76	C	5.7	0.15	113	7.4	3.8	0.2	0.3	0.4	0.3	6.4	18.1	65	3.2	1.6	1.9
Commerce silt loam: (S79LA-9-3)	0-6	Ap1	7.5	1.54	272	12.1	4.7	0.5	0.1	0.0	0.0	2.5	19.9	87	0.0	0.5	2.6
	6-12	Ap2	7.5	1.20	260	12.5	4.7	0.3	0.1	0.0	0.0	2.0	19.6	90	0.0	0.5	2.6
	12-22	B2	7.9	0.58	215	13.9	4.7	0.2	0.1	0.0	0.0	2.0	20.9	90	0.0	0.5	3.0
	22-32	B3	7.9	0.53	232	12.0	4.3	0.2	0.2	0.0	0.0	2.0	18.7	89	0.0	1.1	2.8
	32-51	C1	7.7	0.67	252	14.1	5.1	0.2	0.2	0.0	0.0	2.5	22.1	89	0.0	0.9	2.8
	51-68	C2	7.4	0.72	158	20.0	7.7	0.5	0.2	0.0	0.0	3.9	32.3	88	0.0	0.6	2.6
Convent very fine sandy loam: (S79LA-9-4)	0-5	Ap1	5.8	1.59	124	6.1	2.8	0.4	0.1	0.0	0.2	4.4	13.8	68	0.0	0.7	2.2
	5-10	Ap2	6.4	0.91	165	7.1	3.1	0.2	0.1	0.0	0.0	3.4	13.9	76	0.0	0.7	2.3
	10-20	C1	7.8	0.34	184	8.1	4.0	0.1	0.1	0.0	0.0	1.5	13.8	89	0.0	0.7	2.0
	20-35	C2	7.9	0.34	193	7.4	3.4	0.1	0.1	0.0	0.0	1.0	12.0	92	0.0	0.8	2.2
	35-60	C3	7.9	0.87	203	8.9	3.8	0.1	0.1	0.0	0.0	0.0	12.9	100	0.0	0.8	2.3
Coteau silt loam: (S79LA-9-5)	0-6	Ap	5.6	1.01	17	3.1	1.2	0.3	0.1	0.0	0.2	3.0	7.7	61	0.0	1.3	2.6
	6-12	B21t	5.1	0.43	5	3.3	2.0	0.4	0.1	2.1	0.5	7.9	13.7	42	25.0	0.7	1.6
	12-15	B22t	5.1	0.10	5	2.2	2.4	0.4	0.3	5.0	0.0	11.8	17.1	31	48.5	1.8	0.9
	15-25	B&A'2	5.4	0.04	5	2.2	2.7	0.2	0.4	4.4	0.4	11.8	17.3	32	42.7	2.3	0.8
	25-37	B24t	5.5	0.10	5	3.2	3.5	0.2	0.7	4.2	0.2	9.3	16.9	45	35.0	4.1	0.9
	37-60	B3	5.5	0.04	5	4.8	4.5	0.2	1.0	2.8	0.3	5.9	16.4	64	20.6	6.1	1.1
Crowley Variant silt loam: (S79LA-9-6)	0-7	Ap	5.4	1.59	18	2.1	1.4	0.1	0.3	0.6	0.4	5.9	9.8	40	12.2	3.1	1.5
	7-16	A2	5.4	0.96	6	1.5	1.1	0.1	0.4	2.3	0.4	6.9	10.0	31	39.6	4.0	1.4
	16-26	IIB21t	5.8	0.87	5	5.8	4.9	0.1	2.4	2.7	0.3	9.3	22.5	59	16.7	10.7	1.2
	26-35	IIB22t	5.8	0.72	5	7.0	5.7	0.1	3.8	0.6	0.4	8.8	25.4	65	3.4	15.0	1.2
	35-47	IIB23t	6.4	0.43	5	8.4	6.8	0.1	4.8	0.0	0.0	4.9	25.0	80	0.0	19.2	1.2
	47-81	IIB3	7.7	0.04	6	8.4	6.6	0.1	5.0	0.0	0.0	1.5	21.6	93	0.0	23.1	1.3
	81-96	IIC	8.4	0.04	67	15.1	8.1	0.2	6.7	0.0	0.0	0.0	30.1	100	0.0	22.2	1.9
Deerford silt loam: (S79LA-9-7)	0-4	Ap	5.8	3.18	37	8.2	4.5	0.2	0.4	0.1	0.2	5.4	18.7	71	0.7	2.1	1.8
	4-7	A2	6.0	0.87	6	9.3	4.0	0.1	0.2	0.0	0.0	3.4	17.0	80	0.0	1.2	2.3
	7-13	B21t	5.4	0.43	5	8.7	6.1	0.1	2.1	0.2	0.4	6.9	24.0	71	1.1	8.8	1.4
	13-24	B22t	6.6	0.29	29	12.8	5.4	0.1	3.8	0.0	0.0	3.0	25.1	88	0.0	15.1	2.4
	24-39	B23t	7.4	0.15	76	7.6	5.6	0.1	3.4	0.0	0.0	2.5	19.2	87	0.0	17.7	1.4
	39-55	B3	7.5	0.15	72	6.8	5.3	0.1	4.1	0.0	0.0	1.5	17.8	92	0.0	23.0	1.3
	55-78	IIB21tb	7.6	0.15	60	5.3	4.4	0.1	3.6	0.0	0.0	1.0	14.4	93	0.0	25.0	1.2

See footnotes at end of table.

TABLE 17.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil sample and number	Depth from surface	Horizon	pH	Organic matter	Available P	Exchangeable cations: Ca	Mg	K	Na	Al		Exch. acidity	C.E.C.*	Saturation: Base	Al	Na	Ca/Mg ratio
	In			Pct	Ppm	--------Meq/100g--------							Sum	Pct	Pct	Pct	
Dundee Variant clay: (S79LA-9-8)	0-4	Ap1	6.2	2.50	59	18.9	8.1	0.8	0.1	0.0	0.0	5.4	33.3	84	0.0	0.3	2.3
	4-7	Ap2	6.4	1.11	81	20.0	8.1	0.6	0.1	0.0	0.0	6.9	35.7	81	0.0	0.3	2.5
	7-14	IIAb	6.3	0.87	15	13.0	7.0	0.2	0.1	0.0	0.0	6.9	24.2	84	0.0	0.4	1.8
	14-25	IIB21tb	6.2	0.43	9	13.0	7.0	0.2	0.1	0.0	0.0	3.9	24.2	84	0.0	0.4	1.8
	25-30	IIB22tb	6.3	0.37	31	10.8	5.8	0.2	0.1	0.0	0.0	3.0	19.9	85	0.0	0.5	1.9
	30-52	IIB31b	0.19	0.19	104	9.4	4.7	0.1	0.2	0.0	0.0	2.0	16.4	88	0.0	1.2	2.0
	52-72	IIB32b	6.8	0.24	178	20.0	8.1	0.5	0.9	0.0	0.0	5.4	34.9	84	0.0	2.6	2.5
Fausse clay: (S79LA-9-9)	0-7	A1	5.7	3.27	83	20.0	8.1	0.8	0.2	0.2	0.2	15.2	44.3	66	0.7	0.4	2.5
	7-13	IIA	6.3	1.35	85	20.0	8.1	0.6	0.3	0.0	0.0	12.8	41.8	69	0.0	0.7	2.5
	13-22	IIB21g	6.5	1.35	65	20.0	8.1	0.7	0.5	0.0	0.0	9.8	39.1	75	0.0	1.3	2.5
	22-37	IIB22g	6.7	1.11	94	20.0	8.1	0.6	0.6	0.0	0.0	10.3	39.6	74	0.0	1.5	2.5
	37-49	IIC1g	7.1	1.06	130	20.0	8.1	0.6	1.1	0.0	0.0	9.3	39.1	76	0.0	2.8	2.5
	49-66	IIC2g	7.3	0.34	123	20.0	8.1	0.6	1.2	0.0	0.0	8.4	38.3	78	0.0	3.1	2.5
Gallion silt loam: (S80LA-9-1)	0-8	Ap	5.6	1.97	38	5.6	3.3	0.4	0.1	0.0	0.2	4.5	13.9	68	0.0	0.7	1.7
	8-15	B21t	5.6	1.15	10	6.8	4.1	0.2	0.2	1.0	0.4	5.0	16.3	69	7.9	1.2	1.7
	15-25	B22t	5.6	0.72	19	5.7	3.9	0.2	0.1	0.8	0.4	4.5	14.6	69	7.1	0.7	1.5
	25-37	B23t	5.8	0.53	21	4.8	4.5	0.2	0.1	0.2	0.4	1.5	11.1	86	2.0	0.9	1.1
	37-48	B3	5.9	0.37	46	4.0	4.0	0.2	0.1	0.0	0.2	0.0	8.3	100	0	1.2	1.0
	48-66	C	6.2	0.34	81	3.6	4.2	0.2	0.1	0.0	0.0	0.0	8.1	100	0	1.2	0.9
Gore silt loam: (S79LA-9-10)	0-4	A1	5.4	4.18**	16	5.4	2.0	0.2	0.1	0.2	0.3	7.8	15.5	50	2.4	0.6	2.7
	4-7	A2	5.1	0.96	6	1.2	0.5	0.1	0.1	2.2	0.4	2.5	4.4	43	48.9	2.3	2.4
	7-15	B21t	5.1	0.53	5	2.4	1.8	0.1	0.1	7.2	0.8	13.8	18.2	24	58.1	0.5	1.3
	15-29	B22t	5.1	0.39	5	3.4	2.4	0.2	0.3	7.4	0.9	13.5	19.8	32	50.7	1.5	1.4
	29-36	B23t	5.4	0.15	5	7.4	4.5	0.2	0.6	4.1	0.7	11.3	24.0	53	23.4	2.5	1.6
	36-47	B31	5.4	0.04	5	11.0	3.6	0.2	0.9	0.2	0.2	8.3	24.0	65	1.2	3.8	3.0
	47-57	B32	5.7	0.04	51	18.8	8.1	0.3	1.7	0.2	0.3	2.0	30.9	94	0.7	5.5	2.3
	57-66	C	6.7	0.10	105	20.0	8.1	0.4	2.3	0.0	0.0	3.4	34.2	90	0.0	6.7	2.5
Kolin silt loam: (S79LA-9-11)	0-4	A1	5.8	3.56**	8	4.8	1.4	0.1	0.1	0.0	0.4	11.3	17.7	36	0.0	0.6	3.4
	4-13	B21t	5.2	0.39	5	2.4	1.7	0.1	0.1	6.9	2.3	10.8	15.1	28	51.1	0.7	1.4
	13-22	B22t	5.3	0.24	5	1.9	2.1	0.1	0.2	5.0	0.9	13.8	18.1	24	49.0	1.1	0.9
	22-27	B&A'2	5.4	0.19	5	1.4	4.3	0.1	0.3	8.2	0.0	12.8	19.0	33	56.9	1.6	0.3
	27-39	IIB24t	5.6	0.10	5	4.7	4.9	0.2	0.6	6.8	1.1	13.3	23.7	44	37.2	2.5	1.0
	39-60	IIB25t	5.7	0.10	5	8.1	7.4	0.2	0.9	2.7	0.8	9.3	25.9	64	13.4	3.5	1.1
Latanier clay: (S79LA-9-12)	0-5	Ap	6.6	3.75	118	19.4	8.1	0.8	0.1	0.0	0.0	6.4	34.8	82	0.0	0.3	2.4
	5-14	B21	7.7	0.91	161	20.0	8.1	0.7	0.5	0.0	0.0	3.5	32.8	89	0.0	1.5	2.5
	14-27	B22	8.0	0.43	95	20.0	8.1	0.5	0.9	0.0	0.0	3.9	33.4	88	0.0	2.7	2.5
	27-35	IIAb	7.9	0.15	86	9.8	4.0	0.1	0.2	0.0	0.0	0.0	14.1	100	0.0	1.4	2.4
	35-53	IIB21tb	8.1	0.04	149	9.6	5.5	0.2	0.3	0.0	0.0	1.5	17.1	91	0.0	1.8	1.7
	53-60	IIB3b	8.1	0.10	104	5.6	4.2	0.1	0.2	0.0	0.0	1.0	11.1	91	0.0	1.8	1.3
Loring silt loam: (S79LA-9-13)	0-6	Ap	6.0	2.00	36	8.0	2.8	0.6	0.1	0.0	0.0	5.9	17.4	66	0.0	0.6	2.8
	6-13	B1	5.7	0.58	14	7.1	3.0	0.2	0.2	0.2	0.4	7.4	17.9	59	1.8	1.1	2.4
	13-25	B2t	5.5	0.29	17	5.1	2.9	0.1	0.3	0.9	0.5	7.4	15.8	53	9.2	1.9	1.8
	25-40	Bx1	5.4	0.19	7	4.6	2.9	0.1	0.4	1.1	0.5	5.9	13.9	58	11.4	2.9	1.6
	40-49	Bx2	5.5	0.10	35	6.2	3.7	0.2	0.4	0.4	0.4	6.4	16.9	62	3.5	2.4	1.7
	49-61	Bx3	5.7	0.10	109	6.3	3.8	0.2	0.4	0.4	0.3	5.4	16.6	67	3.4	2.4	1.8

See footnotes at end of table.

TABLE 17.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil sample and number	Depth from surface	Horizon	pH	Organic matter	Available P	Exchangeable cations: Ca	Mg	K	Na	Al	H	Exch. acidity	C.E.C.*	Saturation: Base	Al	Na	Ca/Mg ratio
	In			Pct	Ppm	Meq/100g							Sum	Pct	Pct	Pct	
McKamie silt loam: (S79LA-9-14)	0-3	A11	5.2	4.42**	13	4.4	2.5	0.3	0.1	0.5	0.5	12.3	19.6	37	6.0	0.5	1.8
	3-6	A12	5.2	2.16	6	2.7	1.9	0.1	0.1	1.4	0.4	10.8	15.6	31	21.2	0.6	1.4
	6-18	B21t	5.2	0.34	5	7.8	6.4	0.3	0.2	9.2	0.1	19.2	33.9	43	33.3	0.6	1.2
	18-38	B22t	5.2	0.15	5	10.7	8.1	0.3	0.7	3.4	0.6	12.3	32.1	62	14.3	2.2	1.3
	38-49	B3	5.9	0.19	150	15.8	8.1	0.4	1.9	0.1	0.2	5.9	32.1	82	0.4	5.9	1.9
	49-71	IIC	5.7	0.10	207	8.7	7.6	0.2	1.0	0.0	0.2	2.5	20.0	88	0.0	5.0	1.1
Memphis silt loam: (S79LA-9-15)	0-6	Ap	6.0	2.00	71	3.2	0.5	0.2	0.1	0.0	0.0	3.0	7.0	57	0.0	1.4	6.4
	6-22	B21t	5.9	0.43	81	10.4	2.7	0.2	0.1	0.2	0.1	6.4	19.8	68	1.4	0.5	3.8
	22-47	B22t	5.5	0.48	88	8.7	3.0	0.2	0.1	0.3	0.3	6.9	18.9	63	2.4	0.5	2.9
	47-68	C	5.6	0.15	98	7.8	3.1	0.2	0.1	0.3	0.3	4.9	16.1	70	2.5	0.6	2.5
Moreland clay: (S79LA-9-16)	0-6	Ap	6.9	1.00	74	20.0	8.1	1.0	0.3	0.0	0.0	7.4	36.8	80	0.0	0.8	2.5
	6-13	A1	7.7	0.53	170	20.0	8.1	0.6	1.0	0.0	0.0	3.0	32.7	91	0.0	3.0	2.5
	13-24	B21	8.0	0.58	103	20.0	8.1	0.5	2.0	0.0	0.0	1.5	32.1	95	0.0	6.2	2.5
	24-42	B22	7.8	0.48	117	20.0	8.1	0.6	3.9	0.0	0.0	2.0	34.6	94	0.0	11.3	2.5
	42-60	B3	7.7	0.58	119	20.0	8.1	0.7	3.4	0.0	0.0	2.5	34.7	93	0.0	9.8	2.5
Norwood silt loam: (S79LA-9-17)	0-9	Ap	7.4	0.67	311	8.7	3.0	0.1	0.1	0.0	0.0	1.0	12.9	92	0.0	0.8	2.9
	9-16	B2	7.7	0.39	298	20.0	4.6	0.2	0.1	0.0	0.0	0.5	25.4	98	0.0	0.4	4.3
	16-31	C1	7.9	0.34	128	20.0	2.8	0.1	0.1	0.0	0.0	1.0	24.0	96	0.0	0.4	7.1
	31-50	C2	7.9	0.29	156	17.5	3.6	0.2	0.1	0.0	0.0	1.0	22.4	96	0.0	0.4	4.9
	50-65	C3	7.0	0.39	117	13.7	3.8	0.2	0.1	0.0	0.0	2.0	19.8	90	0.0	0.5	3.6
	65-80	C4	7.9	0.00	131	11.5	3.0	0.2	0.1	0.0	0.0	1.0	15.8	94	0.0	0.6	3.8
Roxana very fine sandy loam: (S79LA-9-18)	0-5	Ap	6.1	1.59	72	3.1	1.1	0.1	0.0	0.0	0.2	2.4	6.7	64	0.0	0.0	2.1
	5-14	C1	6.6	0.10	72	2.3	1.1	0.1	0.0	0.0	0.0	0.0	3.5	100	0.0	0.0	2.1
	14-35	C2	7.9	0.19	71	2.6	1.3	0.1	0.0	0.0	0.0	0.0	4.0	100	0.0	0.0	2.0
	35-40	C3	8.2	0.15	105	8.3	1.5	0.1	0.0	0.0	0.0	0.0	9.9	100	0.0	0.0	5.5
	40-62	C4	8.0	0.24	110	14.1	1.9	0.1	0.0	0.0	0.0	0.0	16.1	100	0.0	0.0	7.4
Sharkey clay: (S79LA-9-19)	0-6	Ap	6.1	2.94	61	20.0	8.1	0.9	0.2	0.0	0.0	11.8	41.8	71	0.0	0.5	2.5
	6-16	B21g	6.3	0.77	45	20.0	8.1	0.7	0.3	0.0	0.0	9.3	38.4	76	0.0	0.8	2.5
	16-24	B22g	6.7	0.63	86	20.0	8.1	0.7	0.4	0.0	0.0	7.4	36.6	80	0.0	1.1	2.5
	24-35	B23g	7.0	0.43	87	20.0	8.1	0.5	0.6	0.0	0.0	4.9	34.1	86	0.0	1.8	2.5
	35-60	B3g	7.6	0.15	124	20.0	8.1	0.5	1.6	0.0	0.0	3.0	33.2	91	0.0	4.8	2.5
Sharkey clay, overwash: (S79LA-9-20)	0-12	Ap	7.2	1.59	120	20.0	8.1	0.7	0.2	0.0	0.0	5.9	34.9	83	0.0	0.6	2.5
	12-23	IIA	7.0	0.67	24	20.0	8.1	0.5	0.4	0.0	0.0	7.4	36.4	80	0.0	1.1	2.5
	23-46	IIB2g	6.8	0.39	8	20.0	8.1	0.4	0.6	0.0	0.0	6.4	35.5	82	0.0	1.7	2.5
Solier clay: (S79LA-9-21)	0-6	Ap	6.9	1.06	104	20.0	8.1	0.6	0.2	0.0	0.0	6.4	35.3	82	0.0	0.6	2.5
	6-14	B21	6.9	0.72	12	20.0	8.1	0.4	0.3	0.0	0.0	4.4	33.2	87	0.0	0.9	2.5
	14-19	B22	6.8	0.63	5	20.0	8.1	0.4	0.4	0.0	0.0	3.4	32.3	89	0.0	1.2	2.5
	19-25	IIA2bg	7.0	0.24	5	8.1	3.6	0.1	0.2	0.0	0.0	0.0	12.0	100	0.0	1.7	2.2
	25-42	IIB23tbg	7.0	0.29	5	12.4	5.7	0.2	0.4	0.0	0.0	2.0	20.7	90	0.0	1.9	2.2
	42-60	IIB24tbg	7.1	0.10	5	13.5	5.9	0.2	0.7	0.0	0.0	2.5	22.8	89	0.0	3.1	2.3
	60-77	IIB3bg	7.5	0.04	18	11.9	5.4	0.1	1.3	0.0	0.0	0.0	18.7	100	0.0	7.0	2.2
	77-84	IIC	7.8	0.04	13	11.5	5.5	0.1	1.6	0.0	0.0	1.0	18.7	95	0.0	8.6	2.1
Tensas silty clay, overwash: (S79LA-9-22)	0-4	A1	6.0	1.97	81	20.0	8.1	0.8	0.1	0.0	0.0	7.4	36.4	80	0.0	0.3	2.5
	4-14	IIB21t	5.1	0.58	48	18.4	8.1	0.5	0.2	0.2	0.3	12.8	40.0	68	0.7	0.5	2.3
	14-28	IIB22t	5.4	0.24	105	18.8	8.1	0.4	0.3	0.3	0.3	10.3	37.9	73	1.1	0.8	2.3
	28-36	IIIB31	6.1	0.34	159	18.8	7.6	0.4	0.3	0.0	0.0	7.4	33.8	78	0.0	0.9	2.4
	36-51	IIIB32	6.2	0.29	132	14.9	6.6	0.3	0.2	0.0	0.0	4.9	26.9	82	0.0	0.7	2.2
	51-60	IIIC	6.4	0.19	187	9.3	4.0	0.1	0.1	0.0	0.0	2.5	16.0	84	0.0	0.6	2.3

See footnotes at end of table.

TABLE 17.--CHEMICAL TEST DATA FOR SELECTED SOILS--Continued

Soil sample and number	Depth from surface	Horizon	pH	Organic matter	Available P	Exchangeable cations: Ca	Mg	K	Na	Al	H	Exch. acidity	C.E.C.*	Saturation: Base	Al	Na	Ca/Mg ratio
	In			Pct	Ppm	---------Meq/100g-------							Sum	Pct	Pct	Pct	
Vick silt loam: (S79La-9-23)	0-3	A1	5.2	1.78	7	1.7	0.7	0.1	0.1	0.7	0.4	9.3	11.9	22	18.9	0.8	2.4
	3-7	A2	5.1	0.63	5	2.0	0.5	0.1	0.1	1.8	0.2	5.9	8.6	31	38.2	1.2	4.0
	7-14	B1	5.0	0.19	5	0.3	0.5	0.1	0.1	5.2	0.4	7.9	8.9	11	78.8	1.1	0.6
	14-21	B21t	5.2	0.15	5	0.6	1.1	0.1	0.2	8.1	0.2	11.8	13.8	14	78.6	1.4	0.5
	21-25	B&A	5.4	0.15	5	1.4	1.9	0.1	0.4	7.8	0.0	11.3	15.1	25	67.8	2.6	0.7
	25-36	IIB22t	5.4	0.15	5	4.2	4.2	0.2	1.1	101	0.0	15.2	24.9	39	51.0	4.4	1.0
	36-45	IIB23t	5.3	0.15	5	4.1	3.6	0.1	1.0	5.0	0.2	7.9	16.7	53	35.7	6.0	1.1
	45-63	IIIB3t	5.3	0.10	5	5.4	3.9	0.1	1.4	1.0	0.4	3.9	14.7	73	8.2	9.5	1.4
Wrightsville silt loam: (S79LA-9-24)	0-3	A1	5.5	2.67**	14	4.6	1.4	0.1	0.1	0.1	0.2	6.9	13.1	47	1.5	0.8	3.3
	3-8	A21g	5.1	0.58	5	3.5	1.1	0.1	0.1	1.5	0.3	3.4	8.2	58	22.7	1.2	3.2
	8-15	A22g	4.8	0.24	5	2.0	0.8	0.1	0.1	4.3	0.1	5.4	8.4	36	58.1	1.2	2.5
	15-35	B&A	4.9	0.10	5	3.5	2.5	0.1	0.8	7.2	0.3	11.8	18.7	37	50.0	4.3	1.4
	35-50	B2tg	4.9	0.19	5	7.4	4.7	0.1	1.5	3.2	0.5	7.4	21.1	65	18.4	7.1	1.6
	50-68	B3g	5.1	0.04	10	9.9	5.6	0.1	2.1	0.6	0.4	3.9	21.6	82	3.2	9.7	1.8

*Cation-exchange capacity.

**The average content of organic matter in the plow layer is interpreted to be 2.0 percent or less. Therefore, this pedon is within the range of the series.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Baldwin	Fine, montmorillonitic, thermic Vertic Ochraqualfs
Calhoun	Fine-silty, mixed, thermic Typic Glossaqualfs
Commerce	Fine-silty, mixed, nonacid, thermic Aeric Fluvaquents
Convent	Coarse-silty, mixed, nonacid, thermic Aeric Fluvaquents
Coteau	Fine-silty, mixed, thermic Glossaquic Hapludalfs
Crowley Variant	Fine, montmorillonitic, thermic, Typic Natraqualfs
Deerford	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Dundee Variant	Fine-silty, mixed, thermic Aeric Ochraqualfs
*Fausse	Very fine, montmorillonitic, nonacid, thermic Typic Fluvaquents
Gallion	Fine-silty, mixed, thermic Typic Hapludalfs
Gore	Fine, mixed, thermic Vertic Paleudalfs
Guyton	Fine-silty, siliceous, thermic Typic Glossaqualfs
Kolin	Fine-silty, siliceous, thermic Glossaquic Paleudalfs
Latanier	Clayey over loamy, mixed, thermic Vertic Hapludolls
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
McKamie	Fine, mixed, thermic Vertic Hapludalfs
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Moreland	Fine, mixed, thermic Vertic Hapludolls
Norwood	Fine-silty, mixed (calcareous), thermic Typic Udifluvents
Roxana	Coarse-silty, mixed, nonacid, thermic Typic Udifluvents
Sharkey	Very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Solier	Clayey over fine-silty, mixed, nonacid, thermic Aeric Haplaquepts
Tensus	Fine, montmorillonitic, thermic Vertic Ochraqualfs
Vick	Fine-silty, siliceous, thermic Glossaquic Hapludalfs
Wrightsville	Fine, mixed, thermic Typic Glossaqualfs

*The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

TABLE 19.--PARENT MATERIAL AND SOILS RELATED TO SLOPE, RUNOFF, DRAINAGE, AND WATER TABLE

Parent material and soil series	Slope	Runoff	Internal drainage	Seasonal high water table Depth	Duration
				Ft	Months
Red River alluvium:					
Gallion	Level	Slow	Well drained	>6.0	None.
Latanier	Level	Slow	Somewhat poorly drained.	1.0-3.0	Dec. to April.
Moreland	Level and gently undulating.	Very slow	Somewhat poorly drained.	0.0-1.5	Dec. to April.
Norwood	Level	Slow	Well drained	>6.0	None.
Roxana	Level, gently undulating, and undulating.	Slow	Well drained	4.0-6.0	Dec. to April.
Solier	Level	Slow	Poorly drained	0.0-1.5	Dec. to April.
Local stream alluvium:					
Guyton	Level	Slow	Poorly drained	0.0-1.5	Dec. to May.
Mississippi River alluvium:					
Baldwin	Level	Slow	Poorly drained	0.0-2.0	Dec. to April.
Commerce	Level	Slow	Somewhat poorly drained.	1.5-4.0	Dec. to April.
Convent	Level	Slow	Somewhat poorly drained.	1.5-4.0	Dec. to April.
Dundee	Level and gently undulating.	Slow and medium.	Somewhat poorly drained.	1.5-3.5	Jan. to April.
Fausse	Level or depressional.	Ponded	Very poorly drained.	+1.0-1.5	Jan. to Dec.
Sharkey	Level and gently undulating.	Very slow and slow.	Poorly drained	0.0-2.0	Dec. to April.
Tensas	Level and undulating.	Slow and medium.	Somewhat poorly drained.	1.0-3.0	Dec. to April.
Loess:					
Calhoun	Level	Slow	Poorly drained	0.0-2.0	Dec. to April.
Coteau	Gently sloping	Slow and medium.	Somewhat poorly drained.	1.5-3.0	Dec. to April.
Deerford	Nearly level	Slow	Somewhat poorly drained.	0.5-1.5	Dec. to April.
Loring	Nearly level and gently sloping.	Slow and medium.	Moderately well drained.	2.0-3.0	Dec. to March.

TABLE 19.--PARENT MATERIAL AND SOILS RELATED TO SLOPE, RUNOFF, DRAINAGE, AND WATER SUPPLY--Continued

Parent material and soils series	Slope	Runoff	Internal drainage	Seasonal high water table Depth	Seasonal high water table Duration
				Ft	Months
Memphis	Nearly level, gently sloping, and moderately steep.	Slow, medium, and rapid.	Well drained	>6.0	None.
Prairie Formation terrace deposits:					
Crowley Variant	Level	Slow	Somewhat poorly drained.	0.5-1.5	Dec. to April.
Gore	Gently sloping	Medium	Moderately well drained.	>6.0	None.
Kolin	Gently sloping	Medium	Moderately well drained.	1.5-3.0	Dec. to April.
McKamie	Moderately sloping and strongly sloping.	Rapid	Well drained	>6.0	None.
Vick	Nearly level	Slow	Somewhat poorly poorly drained.	0.5-2.0	Dec. to April.
Wrightsville	Level	Slow	Poorly drained	0.5-1.5	Dec. to April.

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